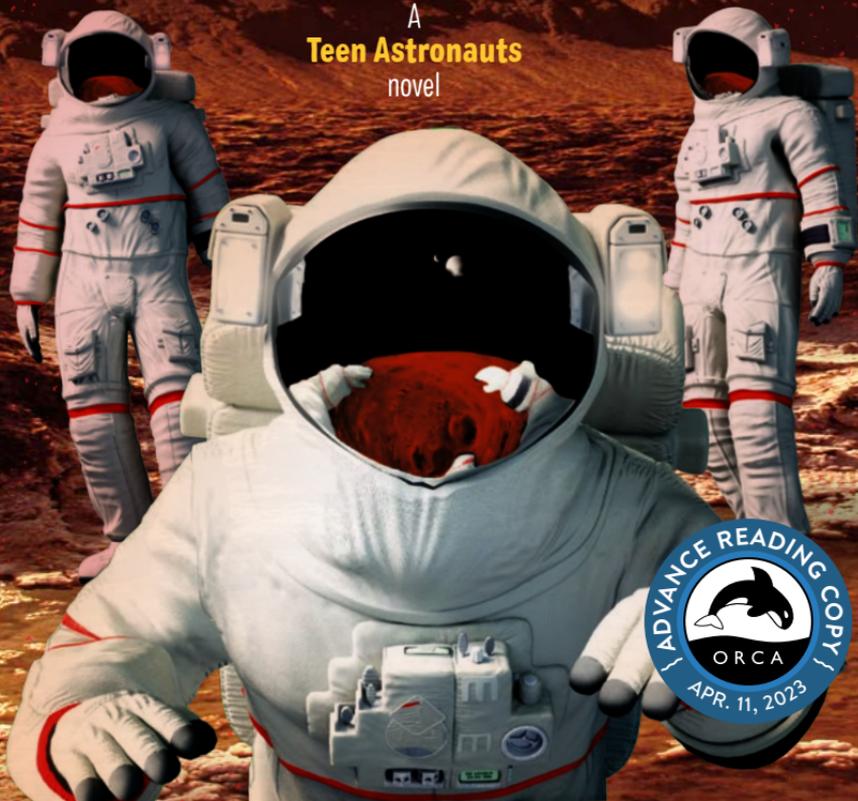


Eric Walters

MISSION TO MARS

A
Teen Astronauts
novel



Mission to Mars

Teen Astronauts #3

Author: Eric Walters

April 11, 2023

In this novel for middle readers, tragedy strikes and fourteen-year-old Houston and two other teen astronauts must complete a mission to Mars on their own.

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KEY SELLING POINTS

- In order to survive, a young teen and his two friends are forced to journey to Mars alone.
- This is the third and final book in the Teen Astronauts series from bestselling author Eric Walters.
- Examines themes of perseverance, leadership and growth mindset in an action-packed adventure.
- Includes lots of real-life NASA data. Bringing STEM to space!

ABOUT THE AUTHOR



Photo credit: Anita Walters

ERIC WALTERS is a Member of the Order of Canada and the author of over 125 books that have collectively won more than 100 awards including the Governor General's Literary Award for *The King of Jam Sandwiches*. A former teacher, Eric began writing as a way to get his fifth-grade students interested in reading and writing. Eric is a tireless presenter, speaking to over one hundred thousand students a year in schools across the country. He lives in Guelph, Ontario.

PRAISE FOR *HOUSTON, IS THERE A PROBLEM?*

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“An energetic and enjoyable read...Dynamic scenes offer an excellent mixture of fact-based science and exciting adventure.” —*CM Reviews*

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Mission to Mars



A Teen Astronauts novel



Eric Walters

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Summary: In this novel for middle readers, after tragedy strikes, fourteen-year-old Houston and two other teen astronauts must complete a mission to Mars on their own.

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Mars is there, waiting to be reached.

—Buzz Aldrin



"It is imperative that you follow all orders, is that understood?"
Commander Ingram said.

I could hear coughing in the background.

"Roger that. All orders will be executed," I said, jumping into the conversation.

"Houston, this is the colonel. Can you all hear me clearly?" he asked.

"Yes, sir, loud and clear," I replied.

"Copy that," Ashley said.

"We can hear you," Teal answered.

"I'm so proud of all three of you. So proud." He started coughing, and then his voice was broken by static. Before I could say anything, he returned. "You have been trained to the highest standards. You can do whatever needs to be done. Do you understand?"

"Yes...yes...of course," I answered. "Why are you saying this now?"

"Because it's true. Because you need to believe it. To believe in yourselves."

"And because we need you to listen to the situation,"
Commander Ingram said.

"You need to follow orders, Baby Bears," Yuri said. "Bulkhead doors to aft section are fused by fire. We cannot get out."

"You're trapped? Maybe we can manually open them from our side."

"It will take work and time," Commander Ingram said. "We don't have time. There's only one solution. We need to starve the fire."

"What does that mean?" Teal demanded.

"We have to take away the oxygen that's feeding the fire,"
Commander Ingram replied.

"But the only way to do that is to depressurize that section of the ship by blowing the air lock," I said.

"Affirmative. You need to blow the aft air-lock seals," she said.

"You're all in the aft section. If we blow the air-lock seals, you'll be blown into space."

"That is correct," Commander Ingram said. *Her voice was completely calm.*

I looked at Teal and then Ashley. I must have heard them wrong. There was no way they wanted me to vent them into space.

"Houston, do you copy?" Commander Ingram said and then began coughing even more.

"Yes, I copy, but you can't be serious. If I do that you'll die."

"Again, affirmative, you need to blow the aft air-lock seals," she replied. *"Are you familiar with the controls and procedures to proceed?"*

"Of course I am, but you can't expect me to do that!"
I exclaimed.

"Are you refusing a direct order?" Commander Ingram asked.

"No, I mean, yes, I am. If I follow your order, I'll kill you all! There has to be another way! There has to be!"

"No choice, Baby Bear," Yuri said.

"What about if you got in EVA suits and we could repressurize that section after the fire is out?" I shouted.

"They're in a different part of the ship that we can't get to," the colonel said.

"But there has to be something," Ashley said.

"There isn't," the colonel replied.

"You have to do it," Frank said, adding his voice. "You have to let them know at Mission Control so they can let our families know what happened."

I thought about the wife and baby he'd left behind on Earth.

"You have to listen to the commander's orders," Frank said. "Please."

"But couldn't we go down and override the doors and open them manually?" I questioned.

"The fire has fused them together so badly that it'll take hours to get through them. There isn't time. There is no other option," Commander Ingram said.

"There has to be. You can put out the fire, or we can open the air lock for a few seconds and then you can—"

"There are no alternatives," she snapped. "None!"

"But if I release the air lock, you'll all die!" I exclaimed.

"We're already dead. There's nothing you or anybody else can do about that. You'll be saving the three of you," Commander Ingram said.

"We won't be saved!" Teal exclaimed. "Without you, without the others, we'll die too!"

"No you won't. You've been training. You can and you will," the colonel said. There was more coughing in the background, and the message was dissolving into static.

"I can't do it," I said.

"You're the pilot. You're the captain. You have to do it," the colonel said. "The five of us are already gone. There's nothing you or anybody else can do. You need to save the mission, and you need to save yourself and Ashley and Teal to continue that mission."

I was frozen. Unable to think and certainly unable to act. What if I just turned off the comm link, pretended to ignore them, just not do it?

"We all knew what could happen when we signed up," Yuri said. "You must do what needs to be done, Baby Bear."

"This is a direct order," Commander Ingram said. "You have to blow the air lock and you have to do it now, before it's too late."

Her voice was calm and in control. How could she be so calm about me killing her, killing all of them?

"This is Colonel Kim. You have to follow orders," she said. "We all are in agreement with the order."

"I can't," I said.

"Yes you can," the colonel said. "You have to. It's been an honor to serve with you, Houston. An honor to serve with all of you."

I looked at Teal and Ashley. They looked stunned, as if it was all so unreal they couldn't even register fear or recognition.

"What do I do?" I asked them.

Neither answered. Neither even looked at me.

"Now, Houston!" the colonel commanded. "Before it's too late. Now!"

I flicked back the safety shield that covered the air-lock buttons. They were double protected because of the consequences of hitting them. They were clearly marked—three sets of double buttons that controlled three different locks. I let my fingers hover over the two buttons that opened the aft locks. If I pushed those buttons, the lock would be blown and all the air would rush into space. It would instantly extinguish the fire and all life.

"It's time, Houston," the colonel said. "We're counting on you."

"Do it, Houston, before it's too late," Frank said. "You can do it."

I felt my whole body go numb. How could I do what they were asking? But then, in a few seconds it wouldn't matter, because we'd all be dead. Not just them, but me and Ashley and Teal. I couldn't let them die. I couldn't. The mission had to go on, and we had to live to make that possible.

I pressed the buttons. There was a swoosh and then nothing. They were gone, and we were alone. Over a hundred million miles from home and another eighty million miles from Mars.

One

I lifted my hand slowly. I looked at the two fingers that had pushed the two buttons that released the air lock. I rubbed my thumb against them, hoping that the pressure, the touch, would reveal this to be nothing more than a dream—a nightmare. With a push of two buttons, those two fingers had ended the lives of five people. I'd killed five people.

Somebody took my hand in theirs. I looked up. It was Teal.

“You had no choice,” she said. “You did what had to be done.”

She leaned forward and pushed the cover back over the buttons—the buttons I'd pushed to open the air lock for the aft section and the buttons that controlled the air locks in two other sections of the ship, including this one.

“Can anybody hear me? Can anybody hear this message?” Ashley asked. “This is the flight deck. Anybody on the ship, please respond.”

I listened, waiting for them to answer and knowing they wouldn't. Still, I had to hope. What else did we have?

“Can anybody read me...please respond.”

Of course they couldn't respond. They were gone. All the other members of our mission—Commander Ingram, Yuri, Frank, Colonel Kim and Colonel Sanderson—were gone. They'd been blown out into space along with all the atmosphere in the aft section. They were floating somewhere far behind us. Fifteen or maybe twenty seconds had passed. At the speed we were traveling, they were already more than a hundred miles behind us.

“Please respond, please respond!” Ashley pleaded.

Teal released my hand. She floated across the room to Ashley's side.

“Ashley, they're gone. They can't hear you,” she said. Her voice was so soft, so calm, so calming.

“No,” Ashley said. “They can't be gone...they can't be gone!”

Teal took the microphone from Ashley and wrapped her arms around her. Ashley began sobbing, and Teal pulled her head down against her shoulder. She was comforting her, rocking her in her arms. Maybe I should do the same. Not just for her but for me. No, I couldn't do that. I had something else I had to do instead.

I shifted in my seat so I could read the control panel, which was made up of two hundred dials and almost as many monitors and gauges. I needed to see the ones for the aft section of the ship. I had to rely on my memory—my nearly eidetic memory—to think through what they each did and where it was on the panel. I'd had that kind of memory my

whole life, and my mother had it too. Some people called it photographic memory, but that didn't really explain it. I had to study something hard to commit it to memory, and there was nothing in the world I'd studied harder and longer than the controls of this ship.

Rather than looking at the dials and gauges, I closed my eyes and visualized them all. I had to focus inward. I had to ignore Ashley crying and Teal talking to her. I had to think just about the controls. In my mind I moved my hand along the top row, silently saying what each of them meant, controlled or signaled. There they were.

I opened my eyes and looked at the control panel. Down toward the bottom, nine rows from the top and four from the left, were the gauges I needed. I moved my hand over to them, counting the rows and columns. Each monitored a separate section of the ship. The aft section registered as a vacuum. It contained no atmosphere. It had all been blown into space when the air lock was opened—when I had opened it. It wasn't an accident or a malfunction but my conscious decision to act that had done it.

The temperature reading was -450 degrees Fahrenheit. That was the temperature outside the ship, with the air blown out of the aft section. It was what I expected. It was good. The lack of oxygen for fuel and the extreme cold would have definitely extinguished the fire. Still, I had to double-check, section by section. If fire was simmering in the wall panel, it would soon burn into the next section. We could survive without the aft section, but we couldn't lose a second part of the ship.

I looked at the monitors for the section beside the aft. Fumes from the fire had flowed into that area before the bulkhead door was closed. It was also where an ongoing fire would be venting.

I looked closely at the readings. There was a high level of carbon dioxide and other gases associated with combustion, but the section had a breathable atmosphere. Without a fire, there were no longer any toxic gases flowing into the compartment.

Next was the atmospheric pressure. It was right on the mark. That was good. The bulkhead door had held and the area wasn't leaking oxygen into the aft section and into space.

I examined the monitors for section after section, and the readings got better the farther they were away from the aft. That made sense. The last section I checked was the flight deck. I knew the air was fine—I was breathing it—but it seemed more real when I read it on the monitors.

"I'm not getting any indication that the fire remains, but I need confirmation. Ashley, can you look at the circuitry to confirm the fire is extinguished?" I asked.

There was no answer.

"Ashley, I need confirmation that the fire is out. Can you confirm that the circuits are showing no heat?"

"Leave her alone," Teal snapped.

I looked up from the dials and over to where Ashley and Teal sat. Teal still had her arms wrapped around Ashley, with Ashley's head pressed against her shoulder.

“You need to give her a moment,” Teal added.

“What I need is to know the fire has been completely extinguished. If it hasn’t, we have to take immediate secondary steps. Ashley is the best qualified to determine what those steps should be.”

“We just lost five members of our crew. She needs—I need—a few minutes.”

“If the fire has migrated, we may not have a few minutes,” I insisted. “I need to know the status. Teal, I need you to prepare an entry for the log and then we have to send a message back to Mission Control.”

“Where do you get off giving us orders?” Teal demanded. “Who put you in charge?”

Before I could answer, Ashley did. “He *is* in charge. He’s the pilot. This is his ship.”

Ashley’s whole body shuddered, and then she reached up and wiped her eyes with the sleeve of her flight suit. She turned toward the bank of instruments on the panel in front of her. She studied them and then spoke.

“The circuits in that section are showing no current, no heat. There can’t be a fire.”

“Excellent,” I said. “And the adjacent compartment?”

“I don’t see anything that would indicate a malfunction, but I’ve turned off so many systems it’s hard to give a definite answer.”

“Can you isolate each system and reinitialize them individually...one at a time?” I asked.

“That’s standard operating procedure.”

“And you’ll monitor to see if anything short-circuits and starts another fire?”

“I’ll monitor each one and make sure,” she said.

“Which system will you start with?” I asked.

“Air scrubbers are the definite priority. I’ll get them online as soon as—”

A ding interrupted Ashley. It was an incoming message from Mission Control.

“They’re probably responding to the automated messages that would have been sent when the fire alarms went off,” Teal said.

At this distance of 100 million miles, with the radio signal traveling at the speed of light—186,000 miles per second—it would take just under nine minutes for the signal to travel from our ship to Earth. Once they received the automated message, the data would be handed over to the appropriate engineers and technicians, who would analyze the information, discuss implications and give a response. That response would be sent back up the chain of command, approved and sent to us, taking another nine minutes to reach our ship.

I looked at my watch. It had been just over thirty-five minutes since the alarm had gone off. Thirty-five minutes had elapsed from my running on the treadmill to being told of the fire, the fire getting out of control and me blowing the air lock and everybody else being...being...gone.

“I’ll play the message,” Teal said. She pushed a button, and the message came on.

“This is Mission Control,” it began. “We received the automated message that alarms sounded to signal a fire in the aft section. We have analyzed the data and suggest the following remedial actions. Shut down circuitry in affected section of the ship, including the air scrubbers.”

“That’s exactly what we did,” Ashley stated.

“Close all bulkheads and contain air contamination in aft compartment. Initiate all automatic fire-suppression methods and have personnel remove panels and manually investigate and take appropriate steps.”

“As we did,” Ashley confirmed.

“Please file a progress report to update Mission Control. We trust all will be well. Transmission ended.”

We all sat in silence. The last few words echoed in my head—*We trust all will be well. Transmission ended.* How could anything be farther from the truth? Transmission had ended. Lives had ended. Five lives. At my hand.

“What are you going to tell them?” Ashley asked.

“The truth. I’m going to tell them what happened,” I said. “But right now I want you to get the scrubbers online. I need the bulkhead doors of each compartment opened and visually inspected.”

“I’ll check the doors,” Teal said.

“And I’ll take care of the scrubbers.”

“And I’ll respond to the message,” I said.

They both got up and moved toward the corridor and the bulkhead door that sealed this section of the ship. Ashley continued to move, but Teal stopped and turned around.

“It wasn’t your fault,” she said to me.

“I know.”

“You were following orders.”

“I know that too.”

She offered a smile—a sad smile—and left.

I knew it wasn’t my fault. I knew I’d been following orders. I also knew that it was at my hands that the order had been executed. That all of them had been executed.

Two

“This is Houston Williams, acting captain of *Horizon*. This is day 148 of our mission. The date is May 18 and our position is approximately 130 million miles from Earth. We are on course for our intercept of the planet Mars. The time is—” I looked at the digital readout. “The time is 17:02. As you are aware, an alarm sounded at 15:56 to indicate that there was a fire aboard the ship in the aft compartment in a panel of the wall. Subsequent visual inspection indicated that this panel was directly beside the bulkhead doors.

“This alarm was responded to immediately by all members of the crew. I, Ashley and Teal were ordered to the flight deck to provide logistical support, to monitor the situation and also to safeguard our well-being by placing numerous sealed bulkhead doors between us and the fire.”

I pushed *pause* on the message. I had to think this through. I took a deep breath and then continued.

“The remaining members of the crew, under the direction of Commander Ingram and Commander Romanoff, proceeded to the aft compartment to initiate fire-suppression procedures in an attempt to extinguish the fire. These procedures were unsuccessful.”

Was that the right term—*unsuccessful*?

“The fire was in the circuitry of a system that was responsible for the operation of the aft bulkhead door. It quickly destroyed the circuitry necessary for the automatic opening of the door, and somehow the heat of the fire disabled the manual controls as well. And while the seal was intact, keeping the fire contained to that section, the door remained frozen shut, and the crew inside were unable to move safely to a different part of the ship.

“It was determined by Commanders Romanoff and Ingram that the fire was gaining strength and they were unable to control or contain it. They decided that the safety of the ship, the lives of the remaining crew and the continuation of the mission were dependent on immediate action.”

I pushed *pause* again. I needed to get an exact time. I scrolled backward through the log book, which listed all communications that happened. They were instantly, automatically converted into text with the time listed beside each quote. There it was—the exact words and the precise time.

I pressed *record* again.

“At 16:37 and 36 seconds, Commander Ingram issued an order, and I will repeat her statement—‘This is a direct

order. You have to blow the air lock and you have to do it now, before it's too late.'

"I asked for further clarification and subsequently Commander Romanoff, Colonel Sanderson, Captain Elliott and Colonel Kim all agreed with the order. I will attach the actual audio recording of their statement for voice-recognition confirmation."

I took a deep breath. I wanted to stop recording. I wanted to believe that none of this had happened, that it was nothing more than a bad dream, a nightmare. I felt my lower lip start to quiver, the tears welling up in my eyes.

"I followed the order given to me by Commander Ingram and supported by Commander Romanoff and other members of the crew. I opened the protective guard covering and pushed the buttons that control the air locks for the aft section.

"This took place at 16:39.

"Subsequently the air lock was opened and the atmosphere in the aft section was vented into space...along with five members of our crew, who were instantly killed."

I was working so hard to sound professional. To make the report the way I'd heard Commander Ingram make them, but instead of making this report, she was part of it.

"These crew members are Commander Rebecca Ingram of the United States. Commander Yuri Romanoff of the Russian Federation. Captain Frank Elliott of Canada. Colonel Seo-Jun Kim of the Republic of Korea. And Colonel Steven 'Sandpaper' Sanderson of the United States. Can you please advise their governments and their families of their...their deaths.

“While I was following a direct order, it was my hand that opened the air lock and caused the deaths of the five crew members. Neither Ashley nor Teal have any responsibility for this. As pilot, as captain on the flight deck, I made the decision to follow this order. There wasn’t time for discussion. If what happened was wrong, then it’s all on me.

“End message.”

I pushed *send* and the recording left *Horizon*, traveling at 186,000 miles per second. In nine minutes Mission Control would know that five crew members were dead.

Their countries would be informed and their families would be told and then the whole world would know—including my family. They all would know that I had been the one who had killed them.

I burst into tears.

Three

“Status update, please,” I asked.

“The air scrubbers have been brought back online,” Ashley reported.

“And the atmospheric readings are almost identical to the conditions prefire,” Teal added.

“And I’ve reinitialized almost every system that was taken offline and there’s no indication of any issues,” Ashley continued.

“No combustion, no short circuits. Everything that has been brought online is working,” Teal said.

The two of them had been working together. Ashley would get a system working and Teal would provide a second check. Redundancy. Double-checking. Standard operating procedure—SOP. Why hadn’t there been redundancy built in to make sure the bulkhead doors couldn’t fuse together?

“I was looking at the reading in the aft section, and the temperature is stabilizing as the atmosphere increases,” I said.

With the air lock to the outside resealed, we had started to reintroduce oxygen to the aft section. The ship was divided into five sections, each named for a letter of the Greek alphabet. The aft section was Alpha. Next was Beta, followed by Gamma, then Delta. The flight deck, where we sat, was Epsilon.

“There’s no loss of compression or atmosphere either through the air lock or through the fused bulkhead door that separates Alpha from Beta,” Teal said. “I’ve been watching the dials closely.”

“But we still have the door between the Beta and Gamma sections closed and sealed as a precaution,” Ashley added.

That was one of the recommendations from Mission Control. We’d received more than a dozen communications in the day since the fire. Mostly there were specific questions from the engineers about the status of the ship and instrument readings, but there were also directions for us to follow. We’d been following them in the sequences given and had provided Mission Control with as many answers as we could.

“At the present rate that the atmosphere is being reintroduced, we can expect that the aft section will be back to normal levels and a livable temperature reestablished by tomorrow afternoon,” Ashley reported.

“That’s when we’ll look for directions as we attempt to open the bulkhead doors,” Teal added.

Ashley would be wearing an EVA suit as she tried to open the doors. That would make it much more difficult for her to work, but it would provide safety if there were a sudden decompression. If the five people in the aft section had been wearing

EVA suits, they would still be alive. In the hours since the air lock had been opened—since I'd opened it—we'd traveled almost half a million miles. We'd left them behind, five small objects, five human bodies, floating in space, orbiting the sun between the orbits of Earth and Mars, never to be seen again but remaining there, unchanged, for eternity. At least their deaths would have been sudden, almost instantaneous—from living to dead in less than a dozen seconds. Was dying fast a better way to go? It had to be. It would have been far worse to be out there in an EVA suit, waiting to die, to run out of oxygen and then heat, wondering if you'd suffocate or freeze to death first.

"Houston, are you all right?" Teal asked.

I looked up at her. "Yes, sure. I was just thinking. Doing calculations." That was sort of a lie and sort of the truth. I was trying to calculate the length of time they would have stayed alive.

"So what now?" Ashley asked.

"I'm going to send a final status update, and then you two should turn in for the night."

"And you?" Teal asked.

"We need to continue to follow protocol. Somebody has to be on duty on the flight deck at all times."

"I could take the first shift," Ashley said.

"It's my place. I'm the pilot."

"But you can't stay here for the next sixty-eight days until we arrive at Mars," Teal argued. "I'm going to come in and relieve you at midnight. You need to sleep too. No argument. Understand?"

I nodded.

“Besides, we may have to alter protocol,” Ashley said. “Changes are going to be needed. Especially if we hope to... hope to...”

“Survive?” I asked.

“Yes. Survive.”

She looked like she was going to cry. If she did, there was no way I wouldn't start too.

“We're going to survive,” I said. “We've been trained.”

“We've been *in training*,” Ashley said. “Do you feel like you've been completely trained—as much as the other astronauts?”

“Not as well, but probably well enough,” I answered.

“That means we have sixty-eight days in which we can work on the simulator, study manuals, get more instructions, more training, view videos, receive instructions from Mission Control. If we're not good enough today, then we'll be good enough by then,” Teal said.

Teal sounded so confident, so sure of herself and sure of us. Of course, that was who Teal was.

A ding signaled another communication from Mission Control.

I let out a deep sigh. The first messages had been difficult but reassuring. Now I was just tired.

“We should hear this,” Teal said. “I'll play it.”

I almost objected. Couldn't whatever it was wait until morning? No, it probably couldn't. I couldn't go to sleep knowing there was something else we should have done and I'd put it off.

I leaned over and pushed the button to start the message.

“Good evening, Houston, Teal and Ashley.”

It was Dr. Fernandez, the director of NASA’s Space Training Facility and co-chair of the Mars mission. I’d been expecting another message from one of the engineers.

“I wanted to thank you for all that you have been doing today. The engineers and managers have informed me of your professionalism in dealing with the issues,” she began.

“Earlier today we held an emergency meeting of the Critical Incident Committee. It is the responsibility of that committee to look into all significant incidents, including injury and deaths. In light of the enormity of this incident, we felt the meeting needed to happen immediately.

“Our review considered the automatic instrument readings, the reports and the audio transmissions, including those made prior to the incident and the incident reports filed subsequently.

“Going through the data and analyzing the information concerning the onboard fire, the engineers were able to determine that if the actions taken had not happened within three to five minutes, a critical point would have been reached and the entire ship would have been destroyed. It is the complete consensus of the committee that the actions of the crew members, both those who perished and those who survived, were done in accordance with all regulations and following the correct procedures.

“There was no choice. The decision to open the air lock was the correct one and the only one that would allow the ship, and the mission, to be saved.”

I let out a big sigh. We'd done what we had to do. We didn't have a choice. I felt like a weight had been lifted off my shoulders.

"We have stated in the report released to the international press that this was the only choice, that it was ordered by Commanders Romanoff and Ingram and agreed to by all mission members, and that their heroic sacrifice was made to allow the mission to continue and for the three remaining members to survive."

It had been the ultimate sacrifice. They'd given up their lives so the mission could continue and the remaining astronauts could survive. They were heroes. They were astronauts.

"We have also decided that the exact details of how the air lock was opened will remain classified information," Dr. Fernandez said.

"What does that mean?" Ashley asked.

"It means they're not going to say it was Houston who pushed the buttons that opened the air lock," Teal said. "Nobody will know."

I knew. I'd always know it was at my hand that they'd died. But I guessed I should be grateful. My family wouldn't know. The families of the people who had died wouldn't know.

Dr. Fernandez continued. "I want to offer my condolences on the loss of your colleagues and friends. I know this has been an incredibly difficult and disturbing day. We are a family, and five members of our family have been lost. And for the three of you, I know how close you were to Colonel Sanderson. The loss must be profound."

Teal reached out and took my hand and Ashley's. I took Ashley's other hand to complete the circle. We'd grieve for them all, but losing him was the hardest.

"He was a leader, a legend, a person respected and liked by everybody he met...even those he came to blows with." Dr. Fernandez smiled. It was a sad smile. "He was a consummate professional, but he was also a proud cowboy. I think he would have been pleased to know that one of his last acts was to steal a SAFER and fly around the International Space Station without permission."

Despite it all, the three of us smiled as Dr. Fernandez laughed and shook her head.

"He was one of a kind. It was this passion for space and exploration that were at the core of his being. He was my friend. I'll miss him tremendously and probably will for every day of the rest of my life."

Ashley and Teal both started to cry.

"And I know it's small consolation, but he told us he'd always hoped that when he died his remains would be sent to space. He got that wish. I also know he died doing what he loved, being in space, being on the biggest adventure of his life. People like him weren't meant to die quietly in a bed but in a burst of glory.

"Finally, he also shared with me, more than once, that one of his greatest accomplishments, one of the things he took the greatest pride in, was the three of you. He said that you were his 'legacy' and would live on beyond him.

"He didn't just train you, he believed in you, he defended you, telling anybody and everybody that you were highly qualified,

that you deserved to be part of the program, that you could do the job. Over the course of the days and months that follow, I believe you will prove him correct.”

I started crying as well.

“We have also made recommendations regarding the need for field commissions to be made. All three of you have been given the rank of captain.”

“We’re captains?” Teal asked.

“As such you will be given all the rights and honors associated with those commissions. As well, you are expected to follow all orders and obligations that come with those ranks. Captain Williams, Houston, as the pilot of *Horizon* you will be placed in the position of commander of the Mars mission.”

“Way to go, Houston!” Teal exclaimed, and Ashley gave me a slap on the back.

“In tomorrow’s transmission we will provide further direction. As we are all aware, there is no way for us to send help or for the mission to be terminated. You are on route to Mars, and that can’t be stopped. The only way back to Earth is to complete your journey to Mars, orbit and land on the planet. You will need to be there for eleven months, until the two planets are close enough together to allow you to journey home. You three must complete the journey. While we can’t be with you, you are not alone. Every person at Mission Control is there to support you and bring you back to your families.

“Again, our condolences.

“End of transmission.”

The screen went blank, and I let out a big sigh.

“Are you two okay?” I asked.

“As okay as we can be,” Ashley said, and Teal nodded.

“They sound pretty confident we can do this,” Teal said.

“Do you think we can?”

I shook my head. “I don’t know. I know we’re going to do our best. Starting tomorrow. Right now you two need to turn in.”

“I don’t know if I can sleep,” Ashley said.

“Me neither,” Teal agreed. “How about if we just stay here...together.”

I thought about exercising my position as the pilot and commander and ordering them to go to bed. But I didn’t want to be alone.

“I’d like that, but just for a while. An hour or so. Then you two have to try to get some sleep.”

“You need to sleep too,” Teal said.

“I will. I’ll just take the first shift and then come and get one of you when it’s time for me to be relieved,” I said.

“I’ll take the next shift,” Teal said.

“And I’ll take the four hours after that,” Ashley added. “We have to pull together.”

“Together is the only chance we have,” I said. And even then, I thought, it probably wasn’t a very big chance.

Four

“Houston, why didn’t you wake me?”

I startled out of my thoughts and found Teal beside me.

“You didn’t wake me up for my shift,” she said. “You should have got me.”

“I went to your room and saw you were sleeping, so I just left you. I thought it was best for you to rest and I’d just stay out here where I could monitor if any of the alarms went off.”

I had strapped myself into one of the command chairs, reclined the back and covered myself with a blanket. I now adjusted the chair so that I was sitting up and swiveled around to look at Teal.

“I’m just glad you were able to sleep,” I said.

“It took a while. Ashley was pretty upset about everything that happened and what’s going to happen. She thinks we’re going to die.”

“Do you believe we’re going to die too?” I asked.

She nodded. “You?”

“I was trying to calculate the odds, and it’s a lot more likely we’re going to die than ever return to Earth alive.”

“But there is a chance we’ll survive,” she said.

“Definitely not impossible,” I said. “It’s possible that we could return home safely. But I’ve thought of at least two dozen ways we could die, and almost all of the first few are up to me to avoid.”

“What do you mean?” she asked.

“I’m the pilot. To begin with, I’ll be responsible for making the course adjustments. I’ll have to use the thrusters to adjust our flight path so we can intercept Mars.”

“Maybe that won’t even be necessary. We were on course before what happened, so why wouldn’t we still be?”

“By opening the air lock and blowing atmosphere into space, our course was changed. We won’t know how much it needs to be corrected until we’ve flown for a few days and Mission Control can give us a calculation and then a remedy.”

“You’ve done that before, using the thrusters for course correction—at least, on the simulator,” she said.

“I’ve done it almost perfectly, but never with a real ship. You know if I don’t use the thrusters correctly to plot our course, we could miss both the planet and orbit by hundreds of thousands of miles, and if we miss the planet, well, we just keep sailing off into space.”

“We’ll keep making changes until you have it right. We have sixty-six days to get it right. What’s the next way you can kill us?” she asked.

“Reaching Mars doesn’t mean we can obtain an orbit. I have to use reverse thrusters to slow down our speed and then reach the planet at the correct time with the correct angle. If we come in too flat, we bounce off the atmosphere and continue into deep space, and if it’s too steep we plunge into the atmosphere and burn up on entry.”

“If you have a choice between the two, let’s burn up. At least it would be quicker,” she said.

“Quicker but the same result. We’d die. So either in a flaming ball or by starving to death when we run out of food.”

“I’d rather go in a blaze of glory. Doesn’t that seem more in keeping with my personality?”

I couldn’t help but laugh. She was right—it did seem like her.

“Okay, let’s say you manage to obtain an orbit. What’s the next way you could kill us?” Teal asked.

“Entry into the Martian atmosphere as I attempt to land *Horizon*.”

“Couldn’t we just stay in orbit and then head back to Earth from there?”

“We’d have to be in orbit for eleven months, and then it’s seven more months back to Earth. First thing, we just don’t have enough food.”

“We have fewer mouths to feed, so couldn’t we stretch what we have? You know, eat less and produce more from the greenhouse?”

“Even with having the extra meals for five astronauts for sixty-six days, that’s only 340 meals, plus some extra stock of

60 emergency meals. That would still put us well short of the 1,250 meals we'd need to live until we got back to earth. But it's not just about the meals. There's also the fuel."

"But if we don't land on Mars, we won't have to lift off, so we won't need all that fuel," she said.

"We need fuel to get out of the Mars orbit. We need fuel for the thrusters to make course corrections along the route. We need fuel for the retro burn to slow us down so we can obtain Earth orbit. We don't have that amount of fuel left," I explained. "The extra fuel and food has already been shipped to Mars. It's on the surface of the planet in the supply ships waiting for us."

"So we have to *land* to get food and fuel," she said.

"And replacement parts, circuits and relays and things we might need for the flight home. Besides, it really would be better for our bodies to experience even Mars's weaker gravity instead of weightlessness for all those months."

"I guess it's decided. We have to land on Mars. So what's the next way you could kill us?"

"I could get *Horizon* to the surface but put us down so far away from the supply ships that we can't get to them," I said.

"How close is close enough?"

"The supply ships have all landed in an area not much bigger than a football field. Plans were for us to land in that same area."

"But we don't *have* to be that close, right? We could always walk to the supply ships if we didn't miss by much."

"It's a big planet. We could miss by a lot. We can walk if I

can get us to within two miles of the landing site. Any farther and our space suits wouldn't have enough oxygen for us to make the trip and survive."

"But once we get to the supply ships, we can use the Mars rover and even the helicopter to bring us back to *Horizon* along with all the supplies, fuel and food we'll need for our blast back into space and return to Earth. It's not like we won't have enough time, because we're down there on the planet for eleven months. This is all doable."

"We can try," I agreed.

"So, if I counted correctly, that's only five major ways you can kill us," Teal said.

"And another hundred ways we could die that have nothing to do with me. They range from a radiation leak or faulty equipment to a meteorite strike, dust storm or Mars quake on the planet to one of us having a medical problem we can't fix to—"

She reached out a hand to stop me. "We'll deal with them, one at a time. Together, the three of us, and it's not like we're alone."

"You think we're going to encounter Martians?" I joked.

"We have all of Mission Control, all of those engineers and technicians and doctors and scientists who are going to do their very best to get us back to Earth alive."

"All of whom are millions of miles away from us. In the end it's up to the three of us," I said.

"And there's nobody I'd rather have on my side than you and Ashley. We're going to make it."

“I wish I could be so—”

“We’re going to make it,” she repeated, this time much louder. “Understand?”

“I understand. We’re going to make it,” I repeated.

“That was unconvincing. Aren’t you supposed to inspire us with your confidence?”

“Perhaps they should have chosen you as the commander,” I suggested.

“*Obviously* I would have been a better choice, but it really doesn’t matter because I’m going to continue to tell you what to do no matter what your title is.”

“It’s nice that some things haven’t changed,” I replied.

She moved closer until she was looking directly into my eyes. “Houston, there is nobody better to be in charge. Ashley and I have complete faith in you. You know that, right?”

I nodded.

“Let’s just take this one step at a time,” she said. “And the first steps for you should be to go to your room and get some sleep.”

“I was thinking of changing rooms.”

“I guess that makes sense. There’s no point in you using the storage room any longer. Whose room are you going to take?”

“I was thinking I could make this into my sleeping quarters.”

“The flight deck?” she asked.

“I’m going to be spending a lot of time here. I can use the chair as my bed, move in some possessions and sleep here. If any alarms go off, I’ll be woken up.”

“You’re going to sleep in here the whole trip?”

“For the remainder of the flight and then while we’re in orbit. Until we land on Mars. Sometimes it felt like Frank did live in here,” I said.

“I miss him already,” Teal said. “Him and the colonel and Yuri and—”

“And all of them. You and Ashley don’t have to share the same sleeping quarters now either.”

“I think it’s better if we do, at least for now. It’s better not to be alone. For any of us.” She paused. “Do you know the stupidest thing I was thinking about last night when I couldn’t sleep?”

“I can’t even begin to guess.”

“I was thinking about that missed kiss on the space station,” she said.

I didn’t know what to say.

“Up until yesterday, that was the worst thing that has happened to me in space. When you tried to kiss me and I told you about my boyfriend. My ex-boyfriend.”

“When did he become an ex?” I asked.

“Just after we were selected for this mission. It didn’t seem right to keep him waiting for two years.”

I laughed. “Did you really think he was going to wait for you?”

“Wouldn’t you have waited?” she asked.

I had to think about the answer. “Maybe. Probably. Yeah, I would have.”

“Good to know, because any potential next kiss between us will have to wait until we’re back on Earth.”

“Is that to give me an incentive to keep us alive and return to Earth?”

“I just don’t think we can complicate things any further.”

I couldn’t help but laugh. “I wish that was the only complication we had. Come to think of it, shouldn’t that be the only complication fourteen-year-olds have?”

“Life has never been that simple for either of us, but that’s why we’re here. Because we can handle it. We can handle whatever happens because we’re survivors. Now how about you stay up here and I’ll wake Ashley, get us all some breakfast and we’ll figure out what needs to be done today.”

“That sounds like a plan.”

She smiled—that megabright, total-confidence smile that she had.

“Teal, thanks.”

“For what?”

“I wish you were safe back on Earth, but at the same time I’m glad you’re here. We’re going to get through this together, the three of us. It’s guaranteed that we’re going to be the first people to get as far as Mars, but we’re going to do more. We’re going to be the first people to set foot on the planet *and* the first people to return to Earth. We’re going to make it.”

“That’s the sort of confident message I need to hear.” She paused. “It almost sounds like you believe it.”

“I do. We’re going to make it.”

Five

Teal and I stood behind the bulkhead door. Through the little window we could see Ashley in her EVA suit, getting ready to open the doors to the aft section. She had a large metal pry bar to force open the doors that had fused together during the fire.

“Ashley, how does it look?”

“All clear to go. What are your readings?”

“Temperature and atmospheric pressure are exactly the same as in other sections,” Teal said. “No alarms being sounded or monitors indicating any problems. You’re good to go.”

Awkwardly Ashley placed the tip of the bar between the two doors and started to use it as leverage to push the doors apart.

“Can you fit it in?” I asked.

“Tight but I’m sure it’s going to—”

The doors separated, though not by more than an inch. She let go of the bar, and it floated away. With both hands and a

foot, she pushed at the doors until they were open more than halfway. She turned and gave us a thumbs-up.

“I’m going to start visual inspection of the walls of the compartment,” Ashley said.

“Are you sure you don’t want an extra set of eyes?” Teal asked.

“It’s better to keep you in a separate compartment. If they hadn’t all been in the one compartment, then all of them wouldn’t have...”

Her words trailed off. We knew what she meant. If all five of them hadn’t been in this one section, they wouldn’t all have died.

“I’m going in,” she said.

“Teal is going to stay here. Keep your comm link open with her. Roger that?”

“Roger!”

I turned to Teal. “I’m going back to the flight deck. Let me know if there are any developments.”

I pushed off and headed back along the corridor toward the front of the ship. I went past the mess and then the sleeping quarters. As I passed the closed doors I thought of the person who had slept in each room. Now, with the exception of the one shared by Ashley and Teal, the rooms were unoccupied. It didn’t seem possible or real. If I stopped and knocked at the door, the colonel would invite me in. If I listened closely, I’d be able to hear Yuri yelling or laughing. Frank would give me a smile and an offer to “come on in” or he’d already be on the flight deck when I arrived.

The gym door was open. There were eight exercise machines for the three of us. We hadn't exercised the day before or today. We had to get back into our routine as soon as possible. We couldn't afford to let our muscles deteriorate. We'd be needing them if we reached the surface of Mars. *When* we reached the surface of Mars. I couldn't stop doubts from entering my head, but I could stop them from entering into conversations. Teal was right. I had to show nothing but confidence.

I thought of a quote from Henry Ford, who invented assembly-line production for cars. He said, "If you think you can, or you think you can't, you're probably right." I had to believe that we could and convince Teal and Ashley of the same thing. That was the only way we'd survive.

As I continued toward the flight deck, I passed the greenhouse. I had to keep myself from stopping. It would have felt so good to go in, float to the ceiling and inhale the fresh oxygen to refresh my thoughts. Maybe I could even pick off a new leaf of lettuce and stuff it in my mouth. That would have been so good. It was so tempting, but I didn't have time. I was the pilot. I was the commander. I was one of only three people alive on the ship and the one most responsible for keeping us all alive.

I pulled myself through the last bulkhead door and onto the flight deck. There was a flashing light, and my heart skipped a beat until I realized it only indicated we'd received a message from Earth. I slipped into my command chair and clicked on the message.

"This is Mission Control," it began.

"Good to know it isn't a wrong number," I muttered.

“We have completed the preliminary analysis of your position, trajectory, flight path and intercept point with Mars. It seems that the emergency venting of atmosphere has resulted in a significant alteration in the course and speed of *Horizon*. Speed has increased by over four hundred kilometers per hour and a correction of .05 degrees will need to be initiated to intercept the planet.”

I hadn't anticipated that much increase in speed or that big a course correction.

“The remedy is being calculated and will be supplied within the next twelve hours. It is essential that this correction be made as soon as possible.”

I understood the urgency. The longer we were on this altered course, the greater the correction would need to be.

“The engineers are also waiting for your report on internal damage. After that we'd like you to do an external inspection of the hull.”

External inspection. Did that mean an EVA? What else could it mean?

“The external inspection was always a possibility, considering the extended time and distance in space, but the onboard fire has made it necessary. We will provide additional instructions about the technical requirements. The EVA can take place either during the remaining flight or while in orbit prior to the landing.

“We await the report of the damage and will provide direction once this report has been analyzed to determine the specifics of the external inspection.

“Mission Control, out.”

The thought of doing an EVA was terrifying. It was the scariest thing we'd done—that *I'd* done—in my time in space. It was only having the colonel there beside me that had made it possible at all. Now he was gone. There would be no backup, no safety, nobody to rescue me.

I had to tell Teal and Ashley that an EVA was planned. The question was, did I have to tell them now? It would only worry them, or at least distract them, and right now we didn't need any more scares or worries or distractions. We were going through so much, being pushed to the very edge of what we were capable of doing and thinking. Would this be the final straw that pushed one of us over the edge?

I decided to keep the EVA to myself for the time being. As pilot and commander, I was allowed to have classified information. Besides, there was no point in worrying them until I had all the specifics—the length of the walk, the tasks that would be required, if it would be solo or require two or even three people. No, it couldn't be three. Somebody had to stay inside the ship.

Then my mind clicked onto a whole new level. What if during the EVA we found there was significant damage? What if the damage lay beneath the outer shell of the ship and was so bad we couldn't repair it? Without structural integrity, the ship couldn't handle the pressure and temperatures of entry into the Mars atmosphere.

As any ship leaves space and enters the atmosphere, there is friction between the speeding ship and the increasingly

dense atmosphere, which generates incredible heat. The leading edge of the ship can reach temperatures of three thousand degrees Fahrenheit, high enough to turn iron into a liquid. The insulation and the way the heat is distributed allow the ship to survive atmospheric entry.

I suddenly had thoughts of the *Columbia* space shuttle. The incident had happened back in 2003. Upon launch the shuttle had lost some insulation. This had happened to another ship in a previous flight, and that ship had been able to return safely to Earth. NASA engineers had hoped *Columbia* could do the same.

But when *Columbia* and its seven-member crew reentered the atmosphere, the shuttle disintegrated, and the whole crew died. All that remained were pieces of debris that hadn't burned up, which fell to the ground. Parts were recovered along a path across northern Texas.

The space-shuttle program was put on hold for two years while NASA investigated. They knew the shuttle had been damaged on liftoff. They also knew they couldn't fix it. Whether the damage was significant or minor, the shuttle had to try to land.

That could happen to us. Regardless of the level of damage, we wouldn't be able to fix it while we were in flight. We'd have to try to land—we'd have to enter the Martian atmosphere. If the damage was minor, we'd survive. If it was too severe and the heat built up, well, at least it would be a sudden way to die. We'd be dead in a microsecond. Sections of *Horizon* and microscopic particles of the three of us would rain down on the

Martian surface. That would be all that remained of our ship.
And us.

There was nothing to be gained by talking to Ashley or Teal about any of this. They didn't need to know. Not right now. Maybe not at all.

I opened a channel to Mission Control.

"This is..." I almost said "Houston." I needed to be more formal. "This is Commander Williams. I want to have a private conversation regarding the EVA being contemplated.

"The purpose of the EVA is to assess hull integrity. However, it is my understanding that we could only repair very minor damage. If the repairs are minor, they would not interfere with entering the Martian atmosphere and landing. If there are extensive repairs necessary, we are not equipped to do those repairs. And since we have no choice but to attempt to land, there is no point in risking the lives of a member or members of my crew in an activity that has no gain. I suggest we initiate entry and landing and hope that the hull has the integrity to withstand the pressure and heat.

"If our entry is unsuccessful, the consequences rest upon my abilities as a pilot and my decision as the commander.

"I believe as the commander that this decision is mine to make in consultation with Mission Control but is not, I repeat, *not*, open for discussion with my crew. They need to focus on the tasks at hand and not on things we cannot control or alter. Please send response to me privately. This is *Horizon*, out."

It was my job as commander to protect the members of my crew from danger. Sometimes that meant protecting them from knowing all the possibilities. Especially of things we couldn't control or change.

Six

“Mission Control, this is *Horizon*,” Teal said. “We wish to report that the aft section of our ship has been reclaimed. It has standard temperature and atmosphere. Systems have been reinitialized, including the operation of the bulkhead doors.”

That was all Ashley. She had changed and replaced half a dozen circuits and relays as well as repaired the physical damage caused when she had to pry open the doors.

“Visual inspection detected no structural damage. We are transmitting the data that was collected for your further analysis. We trust this information will provide reassurance concerning the structural integrity of the hull,” Teal continued.

I wanted to add something else. “We will await further information, questions and directions concerning further steps that need or *don't* need to be undertaken.”

Neither Teal or Ashley showed any response to the *don't need* part of my message.

I'd already had two separate private messages from Mission Control concerning their belief that we needed an EVA and my opposition to that plan. They weren't used to orders being questioned, especially not by a fourteen-year-old. It might have been different if it had been Commander Ingram or Commander Romanoff questioning their decision.

Then again, I couldn't help but think Commander Ingram would have obeyed without question. Colonel Sanderson was the guy who'd taken the SAFER for a joyride and would have argued if he thought they were wrong. Commander Romanoff—Yuri—might have just pretended he didn't hear if he didn't want to do something. He didn't mind telling people they were wrong if he disagreed.

Of course, *everything* would have been different if they were here. I wouldn't be in command, and we'd have astronauts who were experienced, who had done multiple EVAs. Sure, Ashley and I had been out for a short space walk, but we'd been supervised by Colonel Sanderson. He had been on the walk too and was wearing the SAFER so he could rescue us if anything went wrong.

SAFER was short for simplified aid for EVA rescue. It was a device worn over the shoulders of a regular space suit. It had twenty-four fixed-position thrusters that expelled nitrogen gas to propel it. It was basically a little rocket ship that allowed the wearer to fly around in space. If an astronaut doing an EVA got untethered, they could be rescued by someone wearing a SAFER device.

The colonel, wearing that device, had been on our EVA as our lifeguard. We'd been safe with him there to rescue us.

If I couldn't convince them to abandon the EVA, I wondered, could I at least convince them to allow one of us to use a SAFER? Sure, none of us had been trained on it, but we could run the simulators and practice. It would provide some protection.

"We will be attempting the course-change remedy that was sent to us," I continued. I wanted them to know we were doing things they'd asked us to. Just maybe not the EVA.

"We will notify you when this has been completed and then wait for you to assess if our corrected course will intercept with Mars. *Horizon*, out."

I turned to Teal. "Can you please send the message?"

"Sure...and done. The message has been sent. And now, what is it that you're not telling us?" she asked.

"What do you mean?"

"Houston, you are a really, *really* terrible liar," Ashley said. "So what is it?"

I was going to argue, but there was no point in denying it. They were right about my hiding something, and they were equally right that I was a bad liar. Still, that didn't mean I was going to tell them.

"There are some things that a commander of a ship has to decide," I said.

"Are you going to pull rank on us?" Teal asked.

"I'm not pulling rank. It's just that as the commander,

I have the prerogative to decide what information is best kept from my crew.”

“Crew? Is that what we are? What happened to friends?” Ashley said.

“You *are* my friends, but there’s some information I think doesn’t need to be shared.”

“Because you think we can’t handle it?” Teal asked. “Because you think you’re protecting us?”

“Well...”

“Well, what?” she demanded. “Look out the window. We’re millions of miles from home. Most of the members of our crew are dead. We’re not fully trained to complete the mission, and we’re probably going to die. What exactly is it that you think you can protect us from?”

I didn’t have an answer to that. What did I think I could possibly do?

“So tell us,” Ashley said.

I nodded in agreement and surrender.

“They’re concerned that the fire may have compromised the structural integrity of the ship,” I explained.

“I did a full inspection,” Ashley said.

“And then the two of us did a full reinspection and checked every circuit,” Teal added.

“And we didn’t find any sign of weakness,” Ashley confirmed.

“You didn’t find any sign in your *internal* inspection. They want us to do an external inspection.”

“An EVA?” Ashley asked.

“That’s what they’re proposing.”

“And who would do it?” Teal asked.

“They didn’t suggest who would be assigned,” I replied.

“It has to be either Ashley or me,” Teal said, “because it can’t be you.”

“Why not?”

“You’re the pilot and the commander. You have to stay with the ship—you know that,” Teal said.

“She’s right,” Ashley said. “That’s protocol.”

“But I wouldn’t be leaving the ship, really. I’d be outside of it, but I’d still be tethered to it.”

“That doesn’t count. That’s why neither Commander Ingram nor Yuri could go out on the EVA at the space station,” Teal explained.

“But this is different. This is an emergency situation.”

“You can’t claim that *I’m the pilot and commander* stuff one second and then ignore it the next,” Teal argued. “Besides, you’re the only one who can pilot the ship and bring us into orbit and then down to Mars. If you go out there and something happens, then the other two of us are as good as dead.”

“She’s right,” Ashley agreed. “And it’s got to be me because I have experience doing an EVA.”

“And if they need a second person?” I asked.

“Then it will be me,” Teal answered.

“That’s the thing, though. I don’t think *anybody* has to go out there to inspect the ship,” I said.

“But if there’s damage, we need to know,” Ashley answered.

“If there’s minor damage it won’t be a problem, and we

won't really need to repair it. If there's major damage, we can't repair it, so what's the point?"

"You're saying that even if we know there's a major problem, we can't make it right," Teal said.

"And regardless we have to land," I added.

"It's just like *Columbia*," Ashley said. "They knew, and they had no choice but to try to land."

"Exactly. And that's why there's no point in doing an EVA and risking somebody's life for something that can't save us."

"But if we don't do an EVA, we won't know if there's critical damage," Ashley said.

"We won't," I agreed. "We won't know until the ship burns up on entry, and, well, we certainly won't know it for very long."

Teal started laughing, and we both laughed along with her. It felt so right to be laughing and at the same time so wrong.

"I've been trying hard to convince Mission Control that we shouldn't do an external inspection," I explained.

"Have you convinced them?" Ashley asked.

I shook my head. "Not yet. What do you both think? Should we do it?"

"If we can't do anything about what we find, why risk it?" Teal said.

"I agree," Ashley added.

"Then all we have to do is convince Mission Control."

"No, we don't have to convince them of anything," Teal said. "We'll just say no."

"We can't just say no."

“Okay, then how about *no, thank you?*” Teal said. “Would that be better?”

“At least more polite.”

“What are they going to do, send us to our rooms? Ground us? Take away our phones? They can’t do anything at all. If the three of us say there won’t be a space walk, then there won’t be a space walk.”

“Can we do that?” Ashley asked.

They both looked at me. I shrugged. “If we all agree.”

“I agree,” Teal said.

“Then so do I,” Ashley said.

“I’ll tell them, but only after they confirm that we’ve made the perfect course adjustment. Shall we get started?”

“Let’s do it,” Teal said. “Just like on the simulator.”

I settled into the primary seat behind the console while Ashley took the first officer’s chair. She’d be reading out the numbers, and Teal would be acting as Mission Control. She was providing the redundancy since the real Mission Control was millions of miles and minutes away by radio signal.

We had used the simulator a dozen times the day before with the remedy and readings they’d given us, adjusting the course of our simulated *Horizon* to reach the simulated Mars. Each time it had worked according to plan, so precisely on half of the practices that a further major adjustment during the rest of the journey could possibly be unnecessary. This would be just like the simulator.

“You are clear to start on your own time,” Ashley said.

“Roger that.”

It didn't matter when I started. What mattered was the combination of thrusters I used, the level of propulsion and the amount of time the thrusters would be fired. That combination would adjust our course. I would be assisted by the OMS—orbital maneuvering system—which had been preprogramed to turn the thrusters to the correct angles and openings.

We were going to correct the ship's course in two ways. We needed a negative .01 degree adjustment to starboard and an attitude adjustment of .007 in our upward direction. Without the assistance of the OMS computer program, it would have been almost impossible to make corrections this precise. It would have been a series of corrections and overcorrections, sort of like riding a bike down the sidewalk and being too close to the street, then steering too close to the lawns and then too close to the street again, wobbling along and never finding the right path.

"Start the timer on my mark. Ready...now," I said.

I engaged the thrusters, and Ashley monitored the timer while Teal counted out the seconds. There was no sense of motion or change, and, of course, there was no sound. If we hadn't been seeing the dials indicating the engines were on, we wouldn't have ever known it was happening.

"Coming up to time," Ashley said. "I'm going to give you a countdown."

She started counting down from ten. I set the switch to automatically turn off the engine at the appropriate time but monitored visually. I would do it myself if the thrusters stayed on even a microsecond longer than was called for. This had to

be precise, but if it didn't work, we'd just have to make another adjustment. We had enough time and distance and fuel to do it as many times as we needed. Well, up to a point.

"Three...two...one and—"

The monitors showed the thrusters had disengaged.

"Do you think it worked?" Teal asked.

"We can only hope so, but I guess we'll know in a couple of days, after Mission Control plots our course."

"And in the meantime we'll figure out how we're going to tell them that we're not doing an EVA," Teal said.

"We'll also try to work out a reasoned argument to convince them it's not necessary," I replied.

"That's very Commander Ingram of you," Teal said.

"I guess it is. She was a good commander," I replied.

"She was a good person," Ashley added. "They were all good. They didn't deserve to have what happened happen."

We sat there in silence. We hadn't really talked about the crew members very much. We'd been so occupied in doing the things that needed to be done over the past five days that we hadn't allowed ourselves the chance to talk about them. Was this the chance? Was this the time for us to talk about what had happened?

"It would have been Frank sitting at the controls doing the corrections," I said.

"I miss Frank. He was always so friendly," Ashley said.

"He always said he was just a typical Canadian," I replied. "Although he agreed that *friendly* wasn't the case if the Canadian was holding a hockey stick."

“The Russians play hockey too,” Teal said. “Was Yuri a hockey player?”

“He would have been a scary hockey player, but you know how much he really loved playing chess. I loved our games,” I replied.

“He was really helping me with my Russian,” Ashley said. “And Colonel Kim was teaching me Korean.”

“She was so kind and so smart, and such a talented painter,” Teal said. “I wish I could have gotten to know her better.”

“She had children, right?” I asked.

“Two of them,” Teal replied. “One in university, and the other was already a doctor.”

“I didn’t think she was that old,” I said.

Teal laughed, and we both looked at her questioningly.

“I was just thinking...do you think Commander Ingram’s family called her ‘Commander?’”

I chuckled. “Maybe Commander Rebecca.”

“They called her Becca, and her sister called her ReRe,” Ashley said. “She told me that.”

“I wish I’d known,” Teal said. “I would have called her ReRe.”

“The colonel would have if he’d known,” I added.

Now there was silence. We missed them all, but it was different with him. He’d been there from the beginning. He’d been our commander, our teacher, our colleague, our confidant, our mission mate and our friend.

“I miss him all the time,” I finally said.

Ashley nodded in agreement. “I keep doing things and looking over my shoulder, waiting for him to give me a look

or tell me I'd done good...or just be there watching.”

“And telling us he was proud of us,” I added.

“He was proud of us. We deserve people to be proud of us!” Teal said. “We’re pretty impressive, don’t you think?”

Again we all laughed. I knew it was to force away the tears. We sat in silence for a while.

“It was different losing him,” I finally said. “It was like...I don’t know. It was like—”

“Losing a parent,” Teal said.

“Losing a parent again,” Ashley added.

“Yes. It made me think about losing my parents. About my aunt Suzie having to be the one who told me.”

“My mother couldn’t do it,” Teal said. “It was her assistant who told me about my father dying.”

“I was alone,” Ashley said. “It was at the hospital. A doctor and a social worker told me.”

“That must have made it worse.”

She shrugged. “I have nothing to compare it to. At least not until now. My uncle arrived the next day, and we flew right back to their house. I never even saw my house or my things again. I didn’t have a chance to say goodbye to any of my friends.”

Teal wrapped her arms around her as Ashley began to cry. Teal began to cry too. I held back the tears. I was the one in charge. I had to be strong.

“We’re going to do our jobs,” I said. “We’re getting to Mars, and we’re going to get back home again. We’re going to do it to make the colonel proud. To make our parents proud.”

They both looked at me. “I’d like to think they’re still watching.”

“We are going to do it,” Teal said. “Now stop playing commander and come here. You’re allowed to cry too.”

She reached out an arm and pulled me toward them. I started to cry.

Seven

I was working the ARED—advanced resistive exercise device—hard. I could feel it. Beside me Ashley was hooked up to the treadmill. I could see little beads of sweat catching the light and glistening, floating off her and into the air. I was aware I was doing the same, as I was sweating just as hard.

All that sweat would be captured by the scrubbers and reclaimed as drinking water. Every bead of sweat, every drop of condensation, every ounce of urine that was produced was captured, refined, processed and turned into usable water. Like they always say in space, “Today’s coffee is tomorrow’s coffee.”

The timer went off to signal the end of our session on the machines. I let down the bar, the elastic bands pulling it back into place. The treadmill slowed down and then came to a stop.

“Good workout?” I asked.

She nodded as she caught her breath. “It feels good... good to be back into a routine.”

We'd managed to approximate something that was our new normal. The old normal would have had most of the eight exercise machines in motion, with lots of conversation and kidding around. Yuri always made us laugh, and Frank continually made fun of himself and...that laughter was now twenty-two days and millions of miles ago. Now only two of us could be in the gym—or anywhere—at the same time because one person always remained on the flight deck. We never left it unattended for more than fifteen minutes. But even that was longer than SOP.

I had moved my belongings to the flight deck, where I now slept. We often ate meals there as well so we could be together. Teal had stayed in her original room and Ashley had moved next door. She was living in Colonel Kim's room and had carefully collected all of the colonel's personal things and stowed them away.

If we got back to Earth, our plan was to meet with the family of each crew member. We'd pass on their possessions and tell them how sorry we were. We'd share stories and listen to their stories. We'd finally get to meet Colonel Sanderson's wife and kids, and his grandchildren, who were almost as old as us. We'd travel to Russia to meet Yuri's wife and children. We'd tell Commander Ingram's family how much we'd respected her and how we should have called her ReRe.

I figured that of all the families, Frank's wife and baby would be the hardest to meet with. The baby would be almost three by then, a toddler. I remembered the Boo-Boos

being that age. We'd share our memories of Frank because that little toddler would have none.

I still wondered if I owed the families a complete explanation of what had happened. Should I tell them I was the one who'd pushed the button, that I was the one who'd killed their loved one? Mission Control had reinforced their intention to keep that secret, but still—didn't I owe them the full truth?

Right now Teal was sitting in the pilot's chair and monitoring the dials and gauges, ready for any incoming messages or emerging problems. She had taken the morning shift.

"What's on the agenda today?" Ashley asked.

"I have some work in the greenhouse, and don't you have some relays to check?"

"I'm going to go through all of the Gamma section, circuit by circuit. It's good to know we're on an exact intercept course."

"I think that made them more willing to accept that we didn't want to do an EVA."

"I'm glad." She pulled off the last pieces of the harness and floated slightly into the air. "Do you think there is structural damage?"

"I'd like to think the hull has integrity, but we'll probably never know."

"You're right. We'll explode before we even know there's damage. I think we made the right decision...although wouldn't you like to know?"

I shook my head. "Curiosity about something we can't change, something that might get you or Teal killed, isn't worth it."

Almost on cue the door opened and Teal entered. I had an instant rush of fear—had something happened?

“Houston, relax. Everything is fine,” she said. She always could read me like a book. “It stinks in here! You two need to shower and put on clean clothing. I have something for you both.” Under her arm she was carrying what looked like a couple of blue flight suits. Why would she bring us flight suits?

She held one out, and then I realized they were different. On the left shoulder where there had been a single American flag to represent our country, there were now three American flags. And on the right shoulder were the flags of Russia, Canada and South Korea. The flags representing Yuri and Frank and Colonel Kim and Commander Ingram and Colonel Sanderson. I felt a lump in my throat.

“I sewed them onto a flight suit for each of us. I took them off their uniforms. I know they would have understood.”

“Of course they would!” Ashley exclaimed.

“The extra American flags are for the colonel and ReRe and, of course, the other three, well, you know.”

I took one of the suits. “They look wonderful.”

“Thank you for doing this,” Ashley said.

“I thought it was the right thing to do. I want to remember them. I want to honor them.”

“You did...we will...it was the right thing to do,” Ashley said as she took the other flight suit from Teal. “They’re still part of the crew.”

“I didn’t even know you could sew,” I said.

“One of the skills all fashion models have, for making last-minute adjustments. One of the few practical skills my mother taught me.”

It was rare for Teal to talk about her mother. Ashley and I had had a chance to talk to our families. Well, exchange messages with them. Teal and her mother hadn't communicated since the crew deaths.

“How about if we get cleaned up and change into our new flight suits?” I suggested.

“I also thought we could wear them when we attend the funeral,” Teal said.

“That would be nice,” Ashley agreed. “It will be our way of letting their families know that we haven't forgotten them.”

“That we'll never forget them. Never,” Teal said.

There was an International Day of Mourning scheduled on Earth to coincide with the funerals of the five astronauts. Obviously we couldn't be there, but the ceremonies would be beamed to us from Russia, Canada, South Korea and the US capital. Although there were no remains to bury, the ceremonies would honor the astronauts and give their families and the entire world a time to grieve together. Teal had given us a way to honor them, even if we didn't have an official way to grieve. Maybe they wouldn't even want us to grieve. Maybe they would just want us to survive. And complete the mission. I could hear Colonel Sanderson telling me to “enjoy the ride.”

Eight

Our days had gone from panic to crazy to normal to boring. Each day was divided into two major parts—working on new skills or reinforcing old ones on the simulators, and working out in the gym. In between those activities we crammed in eating, communicating with Mission Control and running routine maintenance and tasks. Those last things took a lot of time, because normally they would have been done by eight people, and now they had to be done by three. Even things I enjoyed, like working in the greenhouse, were just tasks I had to cram into fewer hours.

There was also a different feel to the simulations. Before, I'd spent a lot of time “playing” on the simulator to bring us into an orbit around Mars. It had been fun, and I could fantasize about Mission Control actually letting me try it, knowing that they never would. Now I was doing it with the full knowledge that I was going to be the pilot. Not Teal or Ashley. Me. There was nobody else. If I did it wrong, we'd

be dead. Dead fast if I approached too steeply and we burned up on entry into the Martian atmosphere, or slow death if we “bounced” off the atmosphere, didn’t get captured by gravity and continued past the planet and off into space. It wasn’t like I could aim a little more one way or the other. I had to be precise. I had to be perfect. I had to do it right the first time because there was no second time.

So far I’d run the simulation fifty-one times and gotten it right forty-seven of those times. Twice I’d bounced us into space, and twice we’d burned up on entry. After doing it perfectly twenty-two times in a row, I’d developed a real sense of confidence. Then the next run was one of the times when I’d come in too fast and steep and killed us quickly. So much for confidence. I’d continue to run that simulation every day for the next fifteen days, until we reached Mars.

The simulations were all related to course corrections, bringing us into Martian orbit and landing us on the planet. The last one I’d practiced the least. Our plans called for us to orbit the planet for three weeks. During those three weeks I’d be doing nothing except running the landing simulation, until I had it mastered. And if I hadn’t mastered it by then, we’d stay in orbit as long as I needed to get it right. Well, not indefinitely, but with the reduced crew we had enough food to stay in orbit for up to three months.

But there were other complications to being in space for an extended time instead of on the planet. The longer we were weightless, the more potential there was for our bodies to break down, and subsequently we’d need to be on the surface longer

to even function. The gravity on Mars was 38 percent of that on Earth. This meant that something that weighed a hundred pounds on Earth would feel like it weighed only thirty-eight pounds on Mars. It wouldn't hit us as hard as being on Earth, but it was still going to be difficult after being weightless for all these months. We definitely were going to have mobility issues. When we finally landed, how long would it take for us to adjust, to be able to move or lift heavy objects?

And to further complicate it, without Frank or Colonel Kim to do ongoing medical testing, we had no idea how our bodies were holding up. How much bone density or muscle mass had we lost? We were still lab rats, but there was nobody to do the testing or give us results. We really wouldn't know until we were down on Mars and could see how our bodies reacted.

Ashley continued to be responsible for keeping the ship running. She'd been receiving extensive training from the Mission Control engineers. She was getting concrete technical classes and lessons about many things.

Teal was becoming our Mars expert. She was being instructed how to bring systems up once we landed. She was in charge of knowing where everything was on the supply ships, how to put together the greenhouse, distribute and assemble the solar panels to provide power, and use the drilling system to try to find water beneath the surface. If Ashley was being trained to be a flight engineer, then Teal was being trained to be a geophysicist, farmer and miner all rolled into one.

A lot of my roles on the surface would involve taking direction from the two of them and providing physical labor.

We were all going to work hard. But I also had roles that involved being a pilot. I would drive the rover and fly the helicopter—although there was still some question as to whether Mission Control would let me or anybody fly the chopper. I guessed that made sense—since none of us were old enough to get a license to drive a car, why should they trust us with flying on Mars?

My personal alarm sounded. I turned my wrist and turned it off. The alarm meant it was time for me to leave the flight deck and go to the gym and have Ashley replace me up here. I still had an hour to do on the bike to complete my daily exercise. I really didn't want to do it. I didn't want to do anything except sit at the console, monitoring the dials and waiting for the next communication to come in from Mission Control.

We'd had six communications already that day. Four were routine messages, sent every four hours to let us know the systems were working well. We'd responded with standard messages to let them know that all was well on board. Rather than being repetitive these messages were always reassuring. Mission Control may have been 150 million miles away, but people were there watching over us. At least, watching over us in a time-delayed manner.

Each transmission took a little more than thirteen and a half minutes to travel between us and Earth, so there was a twenty-seven-minute delay between sending a question and receiving an answer. That was all right when you had lots of time, but if there was a crisis situation and an answer, remedy or decision was needed immediately, there was no "immediate."

And it was only going to get longer and harder with each passing day.

As we continued to travel, we were roughly six hundred times farther from Earth than any humans had ever been before. That record would be broken with every passing second for the next fifteen days. Then, entering into orbit and landing, we'd continue our journey as Mars moved farther away from Earth. At the farthest point, when the planets were practically on different sides of the sun, in about six months, we'd be close to 250 million miles away.

It was important for people back home to understand that distance. *Horizon* had been launched to take advantage of the “window” when the two planets were closest together. That window wasn't going to happen for another eighteen months. Most people didn't understand the idea of travel between the planets, not only because the distance was so gigantic, but also because they didn't really understand the relationship between the planets.

Compared to Mars, Earth had a much shorter path around the sun—about 584 million miles in its orbit. It traveled faster and circled the sun every 365 days. Well, give or take that extra day that got tagged on every four years. Mars took a full 687 days to do one orbit, so a Martian year was almost twice as long because it was a much, much longer path and traveled slower along that path.

If people understood that, they wouldn't have been clamoring for NASA to send a ship to rescue us. That had been a big issue after the public became aware of the death of our

crew members. People “demanded” that a ship be sent up to get us. First off, there wouldn’t have been a ship ready for almost half a year. And even if it were ready, it couldn’t reach us in time to do any good.

Mars was slower-moving than Earth, going about fifty-four thousand miles per hour, but that was faster than *Horizon* or any other ship could travel. No ship could “catch” Mars, so they’d have to “aim” behind to when Mars came back toward Earth. The trip would be much, much longer and they’d still need at least thirteen months to reach Mars instead of the seven months we’d taken. By the time they finally arrived at the planet and came down to the surface, we would have already left.

I imagined what it would be like if they *were* able to get there. Somebody else would be in charge of the launch, and we’d have company on the way back to Earth. It would be such a relief to have adult astronauts in charge, making all the decisions, piloting the ship. We’d just have to be crew members. Or even just passengers. That was so appealing, but it was only a fantasy. It couldn’t happen. It was up to us. Simple.

There was one other communication that had come in today. It was marked as private for Teal. I obviously didn’t know what it contained, but I was told it was from her mother. She might tell us what the message was about and she might not. We might only be able to guess based on how she acted after hearing it.

Teal always worked so hard at being calm and detached and not letting anything faze her—or at least not letting

anybody see it. She was on a spaceship hurtling through space, piloted by a fourteen-year-old after the death of our five adult crew members, and most of the time she acted like we were on our way to the store to get gum.

That wasn't the case when it came to her mother. Teal had once told me that even when she expected a certain reaction from her—that her mother might ignore or insult or reject her, for example—it still hurt.

We all got weekly messages from our families. Ashley's tended to be very formal. Mine were sometimes chaotic and often just hilarious. The Boo-Boos had a way of adding humor and taking away the worry. But my aunt and uncle, Suzie and Brad, were worried, and I could see they were trying to hide it. I always tried to calm them down, tried my best to be reassuring. Basically, I lied to them and they lied to me.

I'd asked if the Boo-Boos could send Teal messages. They were more than happy to do that. Theirs were often about what they had been eating or watching on TV, and sometimes they were just yelling at each other and fighting. I knew the messages cheered her up, but I thought they also, on some levels, made her a little sad.

Aside from it simply being good to hear from my family, their messages also gave me news about what was really going on back on Earth. Mission Control gave us information and news too, but we figured it was only the news they thought we should know. It was my aunt and uncle who had told me about all the turmoil and people thinking we should be rescued. None of us had even thought of that as a possibility. Because it wasn't.

Brad and Suzie had said there was a lot of discussion about whether our ship had been so rushed into space that it wasn't completely prepared, and that this was why our crew members had died and why our lives were in jeopardy too. The Chinese Space Agency had made it known that this was the reason they'd pulled out of the Mars project.

We all knew the ship had been rushed. Before the accident, the commanders had openly questioned if that was the reason we'd had so many small breakdowns. Teal and Ashley and I had discussed if that was why the accident had happened, why they had died. We didn't know. Nobody did. Accidents, even ones ending in death, did happen. It didn't have to be anybody's fault. At this point, the worst part of thinking the ship was defective wasn't that it had caused those five deaths but that it could cause three more.

"Hey, Houston," Teal called out.

I startled out of my thoughts and jumped slightly. I hadn't heard her enter the flight deck, but then, weightlessness meant silently floating into a room.

"You're a little jumpy," Teal said.

"Why would I be jumpy? I'm in a spaceship millions of miles from Earth, getting ready to set us into a Mars orbit? And if I miscalculate by even a degree, we'll all die?"

"If you want to get technical, I guess that could be a reason. Really, I can't think of another person in the universe I'd rather have at the controls."

"I can name at least two dozen, but they're all back on Earth," I said.

“Okay, I can’t think of another person in this *part* of the universe I’d rather have at the controls,” Teal said.

“That narrows the candidates,” I admitted.

“You and your human-calculator mind are the best chance we have. Ashley and I were talking about how much faith we have in you to do the job.”

“Thanks.”

I really didn’t want to talk about this. There was already enough pressure.

“How was the message from your mother?”

She laughed. It wasn’t a good laugh.

“I really think she doesn’t remember where I am,” Teal said.

“Of course she does. We’re the biggest news in the world from what my family tells me. What did she have to say?”

Teal shook her head. “She was complaining about the way her latest boyfriend is treating her. Just out of curiosity, when do you get old enough that you don’t have *boyfriends* and you start to date men?”

“You’re definitely asking the wrong person.”

“Just once I’d like her to ask how I’m doing, what it’s like for us. I don’t think she even knows we’re in danger, that we could die, that she might never see me again.”

“Maybe she just doesn’t want to worry you,” I suggested.

“She never minds worrying me, so that can’t be it. Look, there’s no point in me being angry at what I can’t change. It doesn’t matter what part of the universe I’m in, she’ll always be in a world where everything revolves around her. Enough

about her. I'm here to relieve you, Commander. Sir." She gave me a little salute.

I unstrapped myself from the command chair and pushed off, inadvertently bumping into her and apologizing. She reached over and grabbed my hand and pulled me toward her until we were face to face.

"I'm going to kiss you," she said.

"What?"

"I'm going to kiss you. I guess I'm either asking permission or giving you a warning. Either way, is that all right?"

"Yes, of course."

She leaned forward, tilted her head and pressed her lips against mine, and I kissed her back.

"Why did you do that?" I asked.

"Didn't you like it?"

"I liked it. I just don't understand it."

"You didn't want me to do it?" she asked.

"I did, but why did you?"

"I did it because I wanted to and I like you and I guess because if something happens to us, I didn't want the last kiss of my life to be that awkward attempt we had on the space station."

"Sorry I made it feel that way," I said.

"Nothing to apologize for. I'm scared, but I'm just glad you're here and that Ashley's here. You two are the closest thing I have to family."

"Family? Boy, that makes this kiss even more awkward than the last one if you think of me as a brother."

“Shut up! You know what I mean!” She released me and gave me a playful push, and we floated away from each other.

“I do.”

“Besides, I know you have important things to do, and I didn’t want you thinking about kissing me to get in the way,” she said.

“What makes you believe I think about that?”

“Don’t you?” she asked.

Reluctantly I nodded my head.

“It’s something that goes through my head from time to time too.”

I hadn’t known that, but it made me feel better that it wasn’t just me.

“And now you believe I’ll think about it less?” I asked.

“That was the idea. Look, I know you need to focus. All our lives depend on it.”

“No pressure there,” I replied.

“It’s not like I’m telling you anything you didn’t know.”

“I know. Our lives depend on my getting us into orbit.”

“And then down to the planet,” Teal added. “But after that our lives depend on what we do on the surface, which is mostly on me. We’re all working to keep each other alive as well as to keep the space program alive.”

“What do you mean?” I asked.

“If we don’t get back, then the whole program will be abandoned or at least delayed for years and years and years.”

“I hadn’t thought about that, but you’re right.” I paused. “Like I needed more pressure.”

“I wasn’t trying to give you more pressure. Besides, don’t you want to prove all those people wrong?”

“What people?” I asked.

“All those people that thought we shouldn’t be here, that we were just a big publicity stunt. If we can pull this off and get back to Earth, just the three of us, we’ll prove to all of them that we belong.”

“I’d like that.”

“And when we do get back to Earth, I’d like you to promise me that the three of us will remain family,” Teal said.

“That’s a promise. A guarantee. Nothing is going to change that after what we’ve gone through. Now, do you want to see something really cool? Lean forward and look through the window to the far, far right, and you’ll see Mars.”

She leaned forward and strained to look. “I can’t see it.”

“It’s there. It’s small, but it’s coming around the corner of its orbit. It’s going to get bigger and bigger over the next fifteen days, until it’s impossible to miss. Well, at least that’s the plan. We’re almost there, which means we’re almost halfway to being home.”

“We’ll do it,” Teal said. “*You’ll* do it. I have complete faith. You go and finish your exercise. You’re going to need those muscles when we land.”

Nine

We sat strapped into the chairs on the flight deck, watching an area slightly to the right of our flight path. In less than thirty minutes we'd reach Mars and attempt to establish an orbit. Mission Control engineers had decided that the greatest danger for us was "bouncing" off the atmosphere and missing the planet. That could happen if we came in too fast or attempted an orbit that was too wide. We'd be entering into orbit in the standard west-to-east direction at a low altitude—around ninety miles above the surface—and at a speed of nine thousand miles per hour. That speed would be fast enough to keep us in orbit and not eroding toward the atmosphere, but well below the speed we'd need to reach escape velocity and break free of Mars's gravitational pull.

The danger with an orbital attempt at that speed and altitude was that if I came in just a little lower and slower, we'd start to enter the atmosphere. We'd already been given, and programmed, the remedy for that. If we needed to maintain

orbital altitude, I'd fire the main engines on the ship and gain elevation.

This was all a new plan that had evolved less than two weeks earlier. All along I'd been running the simulator thinking I had to thread the needle on the orbital entry. This change in plans meant that, instead of a needle, I had a whole open window to fly through. It made it so much easier. I'd wondered why it had taken them so long to come up with this option, but Teal suggested this was probably deliberate. Give me the hard task and then at the last minute provide me with a much easier option. Not that any of this was easy. This was still extremely difficult and precise and something that no fourteen-year-old would ever normally be trusted to execute.

About an hour earlier we'd used the thrusters to turn us 180 degrees around so that we would be facing away from the planet. Now, according to the remedy and formulas given to me, I turned on the main engines. I had a moment of doubt just before I pushed the button to ignite the engines. Had the fire damaged the fuel lines, or was there something we didn't know because we hadn't done an EVA, or would the engines just not work because they hadn't been used for almost seven months? But they all worked perfectly.

The retro burn with the six main engines had gone on for almost forty-five seconds. It acted like a gigantic brake, pushing thrust in the opposite direction to our motion and reducing our speed from over forty-eight thousand miles per hour to just over fifteen thousand. Using the thrusters, I turned us around again so we were facing the planet. There

would be one more burn to reduce our speed a second time. It would take place less than ten minutes from the planet's surface and would be done with only the thrusters. That burn would get us down to orbital speed.

"Mars is so beautiful," Teal said.

I looked up. I'd been so focused on the instruments and the calculations that I hadn't taken my eyes off the controls. The reddish planet seemed to glow with the reflection of the sun on its surface. It filled most of our front view. It looked like a movie rolling out in front of us, the sort of footage you saw in documentaries or at the planetarium. But it was real and right in front of us, and coming up fast.

"This looks so familiar and so different all at once," Ashley said.

"Familiar and different than what?" Teal asked.

"From the moon and from Earth."

Ashley had already seen those two on approach. She was the only one of us who had ever entered orbit before. She'd been on *Horizon* when it had taken a "shake-down" flight to the moon. It had entered a lunar orbit before returning to Earth's orbit. This was going to be the third time she'd entered into orbit. Nobody, no other astronaut, had ever been involved in more than two orbits and nobody had orbited three different celestial bodies. This was Ashley's latest claim to fame.

"It's not as pretty as Earth, but nicer-looking than the moon. The moon looks all dead and bleak, and this seems like it has the potential for life," Ashley added.

“Do you think we’re going to find alien life forms? Little green men?” I kidded.

“Not green, probably red, since the whole world looks red. I don’t think we’re going to find humanoid life forms like us, but I’d be surprised if we don’t find something on the planet that indicates there was life once,” Ashley said.

“Who knows? We might uncover the remains of a long-ago civilization that thought climate change and the danger to the environment were just hoaxes,” Teal said.

“Can you imagine if we did?” Ashley said. “It might make believers out of a whole lot of people. It would change the course of humanity, maybe even save us from ourselves.”

“More likely we’ll find microbes,” I said.

“Hopefully not anything we can be infected with,” Teal added.

“We’ll practice all standard sterilization and containment procedures,” I said, realizing that I sounded like a textbook. “In fact, aren’t you in charge of them?”

“In charge and ready to go, once we hit the surface,” she replied. Then, changing the subject, she said, “I think I see that storm they warned us about,” Teal said.

“That’s it for sure,” I agreed.

Just south of the equator, dust was swirling. It looked like a gigantic tornado. One of the many human-made satellites that orbited the planet had picked it up and alerted Mission Control. The storm was almost five hundred miles across, with wind speeds of sixty miles an hour. It was tossing dust almost ten miles into the sky. Other satellites and probes

that had reached the ground had reported storms that were much, much larger and with wind speeds more than double that speed. So relatively speaking, this storm wasn't that bad. And it was well away from our landing site and didn't pose any risk.

We had been told about the storm before we'd seen it. We were now receiving messages from three different orbital platforms—satellites; automatic reports from the Mars Ground Center, where our supply ships had already landed; and four unmanned rovers that were exploring the planet. They were being given ongoing messages concerning our speed and distance in relative space and time. Rather than having to wait thirty minutes to get a question answered from Earth, we could get communications from Mars in less than a second. One of the platforms was being used by Mission Control to relay messages to us now. It had a better radio receiver and then amplified the message and sent it to us.

"I'm surprised we haven't heard back from Mission Control yet," Ashley said.

"They probably want the last correction to be as close to orbit as possible," Teal said.

That made sense, but it was disturbing that we still didn't know if a correction had to take place. We'd sent our last message almost forty minutes ago. Did that mean they were plotting one final correction to go with the retro burn?

"Are you ready to fire the thrusts for retro burn when they ask?" Teal asked.

“Just waiting for that final message to know about any further corrections. From my readings, we’re looking really good. All we need is to reduce speed.”

“I’m sure the message will come soon,” Ashley added.

“It better. At this speed we’re going to get to the intercept point two minutes before Mars arrives,” I said.

“And what would happen then?”

I let out a little whistle and moved one hand so it passed by the second. “We’d miss the planet by over twenty-five hundred miles and would sail on by it.”

“They’re not going to let that happen,” Teal said.

“Of course not, but we have to do that last retro burn soon. We have to shed over five thousand miles per hour.”

“Could you change the angle of assault?” Ashley asked.

“Of course I could, but we still need the burn. We have to slow down or we’re going to come in too hot.”

“They’ll radio back, but even if they don’t, you could do this without them, right?” Teal asked.

“I could. The information relayed to us from the planet is in real time, instant and accurate.” I looked at the time, speed and distance numbers we’d received thirty seconds earlier from the planet. “I might have to.”

“The message is going to arrive,” Ashley said. “They have to have sent it already.”

“Maybe they did, but there was a sudden solar burst, or they slightly miscalculated the angle of the message, or maybe Mars is sending out some distortion, or the platform they’re using to relay the message is malfunctioning,” I said.

“Do you really believe any of those are possible?” Teal asked.

“I think *all* of those are possible but not probable, but if they don’t signal soon, I have to take action.”

“What would you do?”

“Hit the retro burn for fifteen to twenty seconds to reduce the speed to the correct velocity, then get updated readings from Mars about the speed relative to the approach.”

“And you can do all that without input from Mission Control?” Ashley asked.

“Of course he can!” Teal exclaimed. “He’s a walking, talking calculator.”

“Backed by the OMS, the other onboard computers and the readings from the planet.”

I looked at the closing distance on the monitors. That planet was getting awful close and awful big awfully fast.

“I’m preparing to initiate the retro burn,” I said. “Ashley, on my mark I want you to set the timer for 14.5 seconds.”

“Houston, if you get this wrong there won’t be time to get a message to and from Mission Control with a remedy to change speed or course.”

She was right. If I was wrong with these corrections, I’d have to do a quick recalculation. I wasn’t alone doing this, as I had the readings from the planet, but I still had to interpret all that information, recalculate and then input the results. I wondered if maybe I should just wait to hear from Mission Control. Sit tight and wait and be safe. Or miss the planet altogether and suffer a slow death as we sailed past Mars and, eventually, right out of the solar system. Really, I didn’t have

to worry about leaving the solar system—we would have died long before that, when our food ran out.

“I’m not going to get it wrong. We have to go now. Are you two in agreement with me going independent of Mission Control?”

“Completely,” Teal said.

“Do what you need to do. We trust you,” Ashley added.

“Set timer on my mark. Ready...and now!” I ignited all the thruster engines, and Ashley started counting out the numbers as they came up on the monitors.

“That’s two...okay...four...five...seven seconds...nine...”

“Speed?” I asked.

“Down close to under twelve thousand miles an hour.”

“Still too fast.”

“Coming up to fourteen seconds,” Ashley said.

“We’re still too fast. I’m going for a longer burn. Keep going—count up to twenty-one. Teal, speed relative to the planet?”

“We’re at 11,300...now down to 10,850.”

Ashley continued to count out the numbers as I did a mental calculation based on our deceleration per second. I would shut the engines off when she reached nineteen. She announced that number, and I turned the engines off.

“Incoming message from Mission Control!” Ashley yelled out.

“Read it out while I do the calculations to change our angle and attitude,” I said.

Rather than a voice message, it was instructions for the

computer. “It says we’re to initiate a second retro burn with the thrusters for 18.95 seconds.”

Teal laughed, and I tried not to sigh too loudly.

“You did it! You guessed right!” Teal exclaimed.

“I *calculated* right.”

“Should I send a message to Mission Control confirming receipt of their message?” Ashley asked.

“Negative. Let’s just wait until we have more to tell them.”

As I watched I saw a first glimpse of Phobos, one of Mars’s moons. It was barely visible, only 14 miles in diameter, tiny compared to Earth’s moon, which was 2,159 miles across. It also had an incredibly low orbital path, about 3,700 miles above the planet.

I looked at the instruments. We were inside the orbit of Phobos. We were traveling at slightly more than nine thousand miles per hour. Our angle of approach was perfect. We’d be entering orbit in...I looked at the monitor...in less than twelve minutes. Assuming I wasn’t reading any of the numbers wrong. No, I never read numbers wrong.

“It’s looking good,” I said to Ashley and Teal.

“Do you want me to send that message now?” Teal asked.

“Just wait until we round the corner.”

Rounding the corner meant that we had started to orbit the planet.

“I really can’t talk,” I said. “Let me focus, please.”

I had to be watching the monitors and the feedback from the stations on the planet. I’d take those numbers and do a quick crunch to confirm our flight path. If the numbers were wrong,

and we weren't "bending" around the planet, I'd have time to make a quick thruster adjustment and push us lower. If we were in orbit, after we did two or three rotations of the planet I'd have enough feedback to see if it was a stable orbit or if it was eroding. If it wasn't stable, if it was too low and we were losing altitude, I could use the OMS to initiate a thruster burn and extend our orbital path. The next few minutes were going to tell the tale. These calculations were the most important of my life—so far, at least.

There was a link between our computers and the Ground Center monitoring system on Mars. It was providing real-time data about our speed, altitude and flight path. It wouldn't take any more than a minute of information to know what I needed to do.

"I'm looking at the numbers coming from the satellite and Ground Center," Ashley said. "They look good...right?"

"Leave him alone for a bit more," Teal said. "Let him do his mental gymnastics."

"No, it's all right. I have. We're in orbit."

Teal and Ashley both cheered. I allowed myself a quiet smile and a big sigh.

"Our speed is 9,553 miles per hour and we're at a steady elevation of 89.5 miles. We are in a standard west-to-east orientation, with an orbital inclination of 51.4 degrees—"

"Isn't that the inclination of the space station?" Teal asked.

"That's .2 degrees less, but that was the aim. I could adjust with the thrusters, but it isn't necessary. Our flight path takes us directly over Mars Ground Center and our landing site each

orbit. The time of each orbit should be 245 minutes, so we will have 5.8 orbits each 24-hour period.”

“Should I include all of that in the message to Mission Control?” Ashley asked.

“No need. That’s all being reported automatically from our ship’s computer, and from Ground Center and the satellite platform,” I said. “Just confirm we’re in a standard orbit.”

“Before I do that,” Teal said, “how close are all those readings to the ideal numbers?”

“Speed and elevation are within half a percentage point of ideal and inclination is less than that off the ideal.”

“Then we need to report those numbers exactly,” Teal said. “We also have to tell them that the burn was made before they sent us the remedies.”

“They’d know that too,” I said.

“I don’t care. Let’s tell them that we did it, that *you* did it, without them,” she said.

“I agree,” Ashley said. “And I’m going to tell them. I’m even going to rub it in a little. Agreed?”

I didn’t answer.

“You should be proud of what you did,” Ashley said.

“We’re proud of you,” Teal added, and Ashley nodded enthusiastically.

“Okay. Tell them.”

They both cheered.

I undid my belt, floated out of the chair and pushed away from the panel.

“Can one of you keep monitoring the numbers?”

“Where are you going?” Teal asked.

“The simulation lab. Now that I’ve put us into orbit, I’ve got to get us down to the planet.”

Ten

Teal was sitting at the observation window of the flight deck. Mars filled the entire view, red and rounded at the edges as we saw the horizon, glowing as the sun was rising to the east. We'd been up here as the sun rose eight times a day for each of the fourteen days we had been in orbit. We'd all spent a lot of time during these two weeks staring down at Mars.

We'd also had a little celebration. On August 5, our tenth day in orbit, Ashley had turned fifteen. We had a little cupcake and an unlit candle because fire wasn't something we wanted to mess around with. Mission Control had sung her "Happy Birthday" in a recorded message, and we'd joined in live on the flight deck. I had wished we could have gotten her something special, but still being alive was, I guess, pretty impressive. I'd be waiting until Christmas to pull out the special presents I had for both of them.

I floated in beside Teal.

"You're early to relieve me," she said.

"I'm not relieving you. Just needed to check on something. Anything to report?"

"Nothing at all other than we received the standard check-in message from Mission Control, and I gave them the standard report back. I've just been staring out the observation window."

"It's beautiful and amazing, but it still seems pretty unreal," I said.

"It's all been unreal. Did you just come from the simulator?"

"Where else would I be?"

"How many times have you run the landing simulation?"

"I'm coming up to my fortieth time," I answered.

"And?"

"And I'm getting better. Last eighteen times I've gotten us to the ground without destroying *Horizon* or killing the crew."

"Good to know. How many times did you crash in the first attempts?"

"A few times we burned up on entry. Twice I got us down, but a hundred kilometers away from the Ground Center and supply ships; and once the impact when I landed was so hard that the ship crumbled and toppled over."

Toppling over was definitely a potential problem. We were going to be landing tail down and flight deck at the top. It was like landing a twenty-story office tower with us sitting at the top. The drones from the supply ships had been building us a smooth, flat surface as big as a football field for our landing. It was a big target, but relative to the size of the planet it was nothing. It was the equivalent of finding a needle in a haystack

and then throwing a piece of thread from across the room and having it go through the eye of that needle.

“How long could we stay up here?” Teal asked.

“The orbit has had only the slightest of decays, so I think somewhere between twenty-five and twenty-eight years.”

“That’s not what I mean. How long could *we* stay up here?”

“Our oxygen and water supplies would recycle for at least five years, and we have food for more than three months, so at least ninety days.”

“What are the benefits of staying up as long as possible?”

“You and Ashley will be more prepared with the procedures you’ll need to perform once we land, and I’ll have more time on the simulator to get us down alive.”

“And the reason we should go down sooner?” Teal asked.

“The longer we’re in space, the longer we’re in weightlessness and the greater the potential for muscle and bone-density loss.”

“Which would make us less able to do the work we need to do on the surface,” she said.

“That’s a big factor.”

We had all seen pictures of astronauts so weakened by having been in space for a long time that they’d had to be carried off the ship, and it had taken them weeks to fully recover. Of course, that was before the extensive exercise programs, and we were, as teenagers, losing muscle mass and bone density less than other astronauts had before us.

“But we can compensate by working the exercise machines harder and longer here and building in more recovery time on

the surface before we attempt to work,” Teal said. “Have you done all your time on the exercise machines today?”

“I still have one more session.”

“So you’re saying that the sooner we get down, the better.”

“Better for us and for completing as many of the tests and experiments we’re supposed to run as possible,” I said.

“We can’t possibly do them all, so we’ll have to cancel a lot of the things that were expected to be done,” Teal said.

“Some things won’t happen, but others can’t be canceled. We still need to set up the greenhouse, grow food, expand our living space and get *Horizon* fueled up and restocked with enough supplies to get us back home. Those things have to be done.”

“But there are many experiments scheduled to be done that we probably can’t take on. There were samples to be collected, and an exploration that was going to take place with the rovers and helicopter. We don’t have to do all of those,” Teal said.

“We have to try to do as much as we can. Nobody may be back here for decades to come. We can’t waste a second. We owe it to the program,” I said.

“All we owe them is to try to get back home alive. What’s the biggest thing holding us up from landing right away?”

“Me. I had to use the simulator enough to have confidence that I can get us down without dying.”

“You got us here and into orbit, so you can do this. You did it right on the simulator the last eighteen times. You got it,” she said.

“You know landing is much harder than either getting us into orbit or working the simulator, right?”

“I know it’s harder, but I don’t know how much harder. Is it *twice* as difficult as getting us into orbit?”

I laughed. “I wish it was only that much more difficult. Lots and lots of people have put a spaceship into orbit. Lots have brought a ship down to Earth after a successful mission. Nobody has ever brought one down on Mars. Everything on the simulator is based on calculations that have never been tried.”

“But they’ve landed uncrewed craft on the surface, including our supply ships,” she argued.

“Supply ships that weren’t designed for liftoff again. *Horizon* is different. There’s also precision required with this. Blasting off, you’re just aiming for space. It’s hard to miss. This landing has to be close to the supply ships or we can’t get to the supplies we need to survive or get back off the planet.”

“I just thought since they brought the supply ships down so close to one another, it wouldn’t be that much more difficult to get us down,” she said.

“They were lucky they didn’t have any unexpected complications. We might, and I’ll have to react to them in real time. Just think. Fourteen months ago I’d never even been on an airplane, and I threw up because I got airsick. Now I’m going to land a ship that’s bigger than the biggest plane that’s ever flown, by myself, on Mars.”

“Okay, when you put it that way...”

“And you also have to remember that we’re not even certain the ship’s hull has enough structural integrity for entry.”

“Actually, I’d sort of blocked that out. It’s a good sign that it withstood the retro blasts of the main engines.”

“It’s a great sign, but the pressure and heat of entry are so much greater. At least we know the engines work after that long flight...at least, the three Raptor engines that I used for the retro blast. I figure if those three worked, then all six will work when we need them to land.”

The timer on my watch sounded.

“Look down there,” I said.

“Down where?” Teal asked.

“Wait for it...wait.”

Suddenly her question was answered from the surface. There was a big flash, and then a white light appeared on the surface.

“That’s the Ground Center,” I said. “I’m testing the landing beacon and the light signal that will guide us to where we’re going to land.”

The light went from white to red to blue and then started flashing white. I’d programmed it to shine for thirty seconds. When we attempted to land, it would stay on for the forty-five minutes we’d need to get from orbit to the ground. The light switched again to the alternating colors and then turned off.

“When are we going to land?” Teal asked.

“There are so many factors that have to be considered. We have to be aware of things like weather patterns or storms, the specific time of day, final preparations and permission from Mission Control.”

Teal laughed. “So you’re telling me we’re going to be attempting to land tomorrow.”

“What makes you think that?” I asked.

“Am I wrong?”

“No, you’re not wrong, but how did you know?”

“First off, I know it’s not happening today because you’re not wearing your favorite flight suit,” she said.

I wasn’t wearing the one she’d altered, adding the different flags representing people who were no longer with us.

“I washed it and it has to dry.”

“I figured you’d want to be wearing it when we land and would be washing it, and I was right,” she said.

“You based your decision on my laundry?”

“I based it on your wanting to honor all of them when we land. Wearing the flight suit with the flags from everybody who didn’t make it is the way to have them be part of it, to be there with us.”

I nodded. She was right. That way Yuri would be with us, and Commander Ingram, and Frank, Colonel Kim and Colonel Sanderson.

Actually, the colonel was going to be with me for my entire life, no matter what I did or where I was or who I became. He was going to be there the same way my mother and father were with me. He was like an uncle—no, like a grandfather. Not that I’d ever had one of those, but he was what a grandfather was supposed to be like. I still heard him in my head, offering advice, letting me know I was doing the right thing. I knew he’d be proud of how well I’d done, just the way my parents were proud of me.

“You said this was the most dangerous thing we are going to do,” Teal said.

“Top of the list.”

“Tomorrow we might die.”

“Every day, up here or down there, we might die. Speaking of dying, you have to prepare a video for your family to be sent to Mission Control and shared with them if the landing isn’t successful.”

“Mission Control ordered us to do death videos?”

I shook my head. “No, that order isn’t from them, it’s from your mission commander. Me. I’m ordering it.”

“You’re joking, right?”

“No joke.”

“Can I make the video for your family instead of my mother?”

“I think your mother would be a better idea,” I said.

“Not if I say what I’m really thinking,” Teal said.

“You can say whatever you want.”

“You’re not going to be watching it, right?” she asked.

“Nobody is going to see it unless, well, unless you die, and then it will only be family.”

“Tempting to tell her what I really think, but I’d rather live.”

“I want us all to live, but saying goodbye is important. Just in case. I don’t think you really want her last memory of you to be an angry one. Just tell her you love her.”

“So you want me to lie?” Teal replied. She gave a sad little laugh.

“No, I want you to tell the truth. No matter what you say, you do love her.”

“When did you sign on as psychologist as well as commander?”

“I know you. I know she wouldn’t get to you as much if you didn’t care. Now I have to go and tell Ashley what’s happening and then spend another hour on the exercise bike before I relieve you.”

“I have a better idea. I’ll take a second shift. You go and work the simulator one more time.”

I was going to argue, but really she was right. One more time wouldn’t hurt.

“Thank you. I’ll be back by twenty-two hundred hours to take the last shift before we head down.”

“How about if you get a good night’s sleep in one of the rooms and let Ashley and me handle the watch tonight.”

I hesitated.

“We need you to get some sleep and be sharp. Okay?”

“I doubt I’ll be able to get to sleep.”

“Just try. And trust us to monitor things the way we trust you. Now go.”

Eleven

Ashley was in the first officer's seat beside me, with Teal behind us. All three of us were in our special flight suits. I reached out and touched the second American flag, the one that in my mind represented Colonel Sanderson.

All supplies and equipment had been lashed down and secured. After being in weightlessness for all these days, we were soon going to come under the effects of Mars's gravity. Objects that had floated would come crashing down.

The bulkheads between each section of the ship had been sealed. If there were a breach in one section, the air wouldn't be sucked out of all of them. We could survive a small fracture or sectional failure—unless, of course, it was on the flight deck where we sat.

“Incoming message from Mission Control,” Teal said.

“Put it on. Quickly.”

If we were going to have to change course, we'd have to do it almost immediately.

It was Dr. Fernandez, the director of the Space Training Facility and the co-chair of the International Mars Project.

“Good afternoon,” she began. “I wanted to have an opportunity to speak personally to the three of you as you embark on the last step of the journey to becoming the first members of the human race to set foot on the surface of Mars. All of Mission Control—in fact, everybody on the planet—is behind you.”

“A little more than 178 million miles behind us,” Teal said, and Ashley laughed.

“Houston, Ashley and Teal, in the beginning I have to admit I was one of those people opposed to your involvement in the program,” she continued.

“A glowing recommendation,” Teal commented.

“Further, I thought that including even one of you, let alone all three of you, on the mission to Mars was a mistake.”

“An even more glowing recommendation,” Teal added. “I hope there’s going to be a ‘but’ coming up.”

“But,” Dr. Fernandez continued, “you have proven me wrong in the most remarkable manner. Under the most catastrophic and tragic situation imaginable, you’ve not only survived but have moved the mission forward. We are proud of you. I am proud of you.”

“That’s a little better,” I commented.

“As you know, during your descent to Mars we will lose radio contact.”

During the fifteen or more minutes when we changed our attack angle in the upper atmosphere, the massive

temperatures generated by friction would not allow radio signals to be sent or received.

“Everyone at Mission Control will be waiting, counting the minutes, holding their breath, waiting to receive the signal that you have been successful.”

They were going to be holding their breath for longer than the fifteen minutes of that phase of the descent. Once we’d survived, the message we sent would take another sixteen minutes to arrive at Mission Control. We had a short window of about four minutes to send a signal before our orbital path took us to the far side of the planet, and we’d be out of communication for an additional twenty minutes.

“You need to know that it’s not just Mission Control,” she continued, “but the entire planet that is on pause, waiting for us to relay that information. Billions of people are sitting by their radios and televisions and computers, waiting to hear the message that you’re safe.”

I wondered where my aunt and uncle and the Boo-Boos were. I imagined them at home by the television, watching CNN. I could see the room so clearly, but it all seemed so unbelievable, so unreal that they’d be watching me—us—landing on Mars. I just hoped they never had to see the “death” video.

“I want you to know that all of humanity is sending you their thoughts, blessings, prayers and hopes. Godspeed as you continue to the surface of Mars. Know that you represent not just all of us but the best in all of us.

“Message ended, until our next communication.”

“Nice message,” I said.

“One minute until we hit our mark to engage the OMS,” Ashley noted.

“Programmed and ready to go,” I confirmed.

Our descent toward the planet was going as planned. With each orbit throughout the night, we were coming closer to the planet and its atmosphere. We had gone from 140 miles above the surface in our stable orbit to slightly more than 12 miles. With the next pass we’d start to encounter the outer edge of the atmosphere.

Earth’s atmosphere extended 4.2 miles above the surface. Mars, with only 38 percent of the gravity of Earth, couldn’t hold the atmosphere as close. We’d start encountering atmospheric resistance, the first particles, 6.7 miles above the surface.

Mission Control had given final approval, and we were in constant communication with both the automated Ground Center signals and the satellite platforms that were providing information. It all looked good.

The only potential detail of concern we’d detected was that winds on the surface were starting to pick up speed. They were well below what could be a problem, but we were monitoring the situation. If they got worse, I would have to initiate a thirty-second burn of the main engines to take us back up to a lower-level, stable orbit in order to come in another day. I didn’t want to do that. The waiting was worse than the doing.

“Thirty seconds to our mark,” Ashley said. “I will send a message to confirm our commitment to landing.”

“Affirmative. Please send the videos for our families. Just in case.”

"I'd hoped you'd forget," Teal said. She pushed a couple of buttons. "And confirmed."

There was also a video we'd done together a week before this. It was of us saying we believed in the mission, were aware of the dangers and were prepared, like all astronauts, to make the ultimate sacrifice—our lives. These were all things we believed, but saying them also freed the space agency of responsibility if we did die. I knew that. We all knew that.

It was the first time NASA had asked us to make a video like this. What I'd realized was that they were basically acknowledging that this was the most dangerous thing we'd be doing. At least, so far.

"What's our present speed?"

"Seven thousand and eight hundred miles per hour," Ashley replied.

"It's time. Teal, signal Mission Control that I'm going to engage the OMS and change our attitude."

"Signal sent," Teal confirmed.

We were flying straight, nose leading the way, relatively flat. I was going to change the angle of entry—the *attitude*. I engaged the OMS. It was programmed to activate the thrusters of the Epsilon section at the top, and the Alpha section, which was at the bottom of the ship. I couldn't feel anything, but the monitors showed they'd been engaged.

Then the chairs we were sitting in slowly swiveled. They were designed to change orientation as we changed

our flight angle. Our attitude was being changed from the ninety degrees we were flying to what would be a forty-five-degree angle of attack. Rather than moving forward like an arrow, the ship would be at an angle that exposed the belly of *Horizon* and created more drag and friction, slowing us further. As we dropped in altitude we'd enter the atmosphere and experience increasing contact with particles that would increase the drag, the pressure and the heat against the hull. Over the next fifteen minutes, as we slowed down by almost seven thousand miles per hour, the temperature of the hull would increase to close to three thousand degrees.

This was when we'd find out if the fire had damaged our structural integrity—if we were going to burn up or explode. I glanced over at Ashley. She looked scared. I reached out and took one of her hands in mine, then turned, reached back and took Teal's hand too. She was, as always, trying to look casual. Instead she looked casually scared.

I had to say something, but I wasn't sure what.

"We're going to get through this," I said.

"You have some information, some numbers, that you haven't been sharing with us?" Ashley asked.

"Just a good feeling, but speaking of numbers, what are we registering?"

"Speed has started to drop significantly and the temperature has started to rise."

"Hull temperature?"

"It's no longer negative numbers. It's climbing up. Now it's at 555 degrees."

This was well below where it would end up but it was already more than twice the temperature at which water on Earth would be boiling.

“Can you give me a running count, please. I want speed, altitude, hull temperature, the length of time since I engaged the OMS and assault angle.”

“Roger that,” Ashley said. “Seven thousand two hundred and thirty-four miles per hour, 44.9-degree angle, hull temperature 670 degrees Fahrenheit, 2 minutes 52 seconds since engaging OMS, and we’re 7.2 miles above the surface.”

We were almost a fifth of the way through the change in attitude and to more than a sixth of the three thousand degrees that the hull could be expected to safely handle, and we’d shed about a third of our speed.

I put all those numbers into my head and tried to establish a pattern of time versus temperature, angle and speed. They were all related, but I couldn’t accurately calculate the relationship between them. Would we have shed sufficient speed before we reached the maximum hull temperature, and more important, could the hull handle those temperatures?

I started counting in my head. This was going to take fifteen minutes, which meant nine hundred seconds, and we were now through almost two hundred of those. We’d either come out the other side or we had less than seven hundred seconds to live. Would we even be aware of something going wrong? Would we have a few seconds of consciousness before we exploded? Would I fumble to come

up with some solution and fail before we were all blown into a million little pieces?

“Sudden spike in the hull temperature,” Ashley announced. “Twelve hundred degrees.”

“We must be under 6.7 miles in altitude.”

“Six point two.”

“We’ve entered the upper atmosphere. Expect the temperature to rise quickly and the speed to drop significantly.”

I knew where the temperature gauge was. I didn’t want to see it. I knew that under normal circumstances, three thousand degrees wouldn’t be a concern. But these weren’t normal circumstances.

I went back to counting. If I couldn’t calculate the result, at least I could count out the seconds. It was reassuring, calming, almost like some sort of meditation.

“Five thousand eight hundred and five miles per hour, 44.9-degree angle, 2,600 degrees Fahrenheit, 6 minutes 48 seconds, and we’re now 4.8 miles above the surface.”

It was clear that we were getting hotter more quickly than we were getting slower. As we continued to fly lower into thicker atmosphere, the speed would drop but the temperature would rise even more. The rate didn’t seem right to me. There was one possible solution.

“I’m going to reprogram the OMS,” I said.

“What?” Ashley exclaimed.

“I’m going to reprogram the OMS.”

“You can’t do that,” Ashley snapped. “Those are the numbers given to us from Mission Control.”

“Wait, why do you think you need to do that?” Teal asked.

“We’re heating up too fast. We’re going to go to the safe limit of the hull temperature and maybe even exceed the recommendation. That would be dangerous even if we were certain that the hull *wasn’t* damaged.”

“What would you do instead to stop that?” Teal asked.

“He’d have to change the attitude of attack,” Ashley answered. “Lessen the angle, reduce the friction, and that would take down the temperature.”

“Yes, exactly. Since we won’t be descending so quickly.”

“And you can do that without information from Mission Control?” Teal asked.

“I can reprogram the OMS and then use information from ground monitors and the satellite platform to do the flight after that.”

“Hull temperature is now at thirty-two hundred degrees!” Ashley exclaimed. “If you’re going to do it, you have to do it right now.”

“Reprogramming OMS to fire the thrusters to change the angle of attack.”

I changed the angle from forty-five degrees to fifty-five. That would expose less of the ship’s belly.

“And engaged. Give me the numbers as you see change.”

“Speed is continuing to drop...down to 4,870 per hour. We’re still adjusting angle of attack, which is at fifty-three degrees and—”

“Hull temperature?”

“It’s dropping. It’s down to under 3,000 at 2,950.”

“Altitude?”

“Four point one miles.”

“We’re going to stay at this angle of attack for the remaining time...which is?”

“Two minutes and twenty-six seconds.”

One hundred and forty-six seconds. All I had to do was count to that number, and we’d be through this section. We’d be safe.

“The hull temperature has stabilized at 2,750 degrees,” Ashley reported. “It’s working.”

I felt the seats start to swivel again. We were coming close to the end of the entry period, and the OMS was changing our attack angle. The thrusters were being deployed to slowly move us back toward a flat ninety-degree flight path.

There was an alarm signal from the OMS to indicate it was going to disengage in fifteen seconds. Then I’d be on manual control of the ship once again for the next stage.

“Give me some numbers,” I said to Ashley.

“We’re traveling at 3,450 miles per hour. Elevation is just over three miles, at eighteen thousand feet. Hull temperature is cooled off tremendously at 1,995 degrees. Our angle of attack is...wait for it...wait for it...ninety degrees.”

The OMS kicked off. We were flying flat, and I was now in control of the ship again.

“Let’s get a message to Mission Control and let them know we survived,” I said.

“Sorry, we can’t do that,” Teal replied. “The change in attitude resulted in not shedding as much speed. We have traveled faster and gone farther than we should have. We’re now on the

far side of the planet, and we'll be out of radio communication."

"But if we don't send them a signal, they're going to think we didn't survive," Ashley said.

"There's nothing we can do," Teal said. "We'll prepare the message, and I'll send it as soon as we round the corner."

"By then we'll have even better news to share. We'll be that much closer to landing. They'll just have to hang in there and wait," I said.

"And worry," Ashley added.

"I don't care about Mission Control," I said. "I just wish my family would know."

"They probably won't even know they should be worried," Teal said. "Nobody but Mission Control is aware down to the minute when we're entering the atmosphere."

"You're right. I hadn't thought of that."

"The important thing is that we made it into the atmosphere," Teal said.

"No time or cause for celebration. Landing is still eighteen thousand feet and six thousand miles away. Give me the latest readings, including distance to Ground Center."

Ashley instantly began providing me with numbers. We were close to the monitors on the ground and not far from the closest satellite platform. We wouldn't be relying on just the systems and sensors on *Horizon*.

Even without feedback and data, I knew we still needed to shed more speed. I programmed the thrusters to give us a retro blast that would further decrease our speed.

"Engaging thrusters," I said.

I felt the ship slow down and for a second felt shocked before I realized that was what I should have expected. We weren't in a vacuum in space anymore. It was the same as being in any airplane flying above Earth.

"Air speed is down to 2,750 miles per hour. I'm getting readings off the landing beacon."

"I'm still going to be slowing us down dramatically," I answered.

Not only could I feel the motion; I could hear the thrusters firing. I also felt heavy. The full force of gravity was in play. After being weightless for over nine months, I was shocked at how heavy my arms felt. Even my hands and fingers felt dull and weighty.

"We're rounding the planet. We'll be able to send Mission Control a message in just a few seconds," Teal said.

"They'll know we survived when they pick up the signal from the automatic beacon. Let's wait until we land to send them a message. Teal, can you move over to the seat that monitors the Raptor engines? I'm going to need them shortly."

"I can do that."

There was the sound of something falling, and I swiveled in my seat. Teal was on the floor, pulling herself up.

"Are you all right?" Ashley asked.

"Gravity sucks when you're not used to it."

She climbed into the seat and buckled herself in.

As we decreased our altitude, we were slicing through thicker atmosphere. We could feel the movement and were experiencing turbulence.

We continued to move, losing altitude and getting closer and closer to the beacon. Ashley kept reading out the numbers. Our speed had decreased to just over fifteen hundred miles per hour, the distance from the landing site was now less than nine hundred miles and our altitude was down to ten thousand feet. If our speed or elevation dropped much more, I'd fire one of the Raptor engines to push us higher and faster.

Those engines were our insurance policy. If we weren't coming in at the right angle, or were too low or too far away from the beacon, firing up even two of those engines would be more than enough to propel us completely around the planet so we could make another pass. I knew we had enough fuel, but I still needed to check.

"Teal, give me info about the Raptors."

She started reading back information. They were all ready to go—a simple flip of a switch, and then pushing six individual buttons to ignite them.

"All indicator lights and backup indicators are green," Teal said.

We'd done a small pretest—a five-second burn the day before while in orbit—and all systems had been a go.

"Fuel levels, please," I said.

"We have sufficient fuel to do a thirty-minute full burn on all six engines," Teal replied. "That's enough to get us down and then almost back up into orbit."

"Let's worry about the landing part right now," I said. "Distance from the landing spot and beacon?"

“Seven hundred and fifteen miles,” Ashley replied. “Will the angle of attack change soon?”

“I’m going to start to initiate. I need you to keep a close eye on the hull temperature as I change attitude. Okay, OMS initiated...now.”

I was using OMS to bring about that change. It was pre-programmed for this pattern. When we were entering the atmosphere, it brought us to a forty-five-degree angle to slow our entry. This time we were going to go to a full ninety-degree angle with flight deck up and engines down.

As we changed our angle and got closer to sixty degrees, we’d slow down so much that we’d hit a stall speed. We’d stop moving forward and start plummeting to the ground—well, we would if it weren’t for the Raptor engines. They’d all be ignited in a very precise, controlled way. Rather than pushing us higher, they’d allow us to slowly descend to the landing spot. It was an incredibly precise operation, balancing forward acceleration, stall speed, attack angle, the amount of fuel being fed into the Raptors and the thrusters.

As we changed our angle and hit more atmospheric interference, I felt the turbulence increase. We were shaking. Our seats were starting to tilt degree by degree as the ship itself tilted. It was set to change the angle by a degree every two seconds, so that within three minutes we’d have moved from horizontal to completely vertical.

“Hull temperature rising, but not significant. Well below 1,000 degrees. Forward speed dramatically reduced. We’re down to three hundred miles per hour.”

That was a pretty significant number. Our stall speed was about two hundred miles per hour.

“Distance from the beacon?”

“Twenty-four miles.”

At this speed that was just under five minutes, but our speed would continually decrease as we continued to adjust our angle of attack.

The OMS started beeping. That was the first indicator that we would need to start the Raptors soon. The closer together the beeps, the sooner they would become one solid alarm, and we'd need to ignite all the engines. If they were fed too much fuel, we'd start to rise. Less and we could hover. What we needed was sufficient fuel and force to keep us up in the air but gradually lower us toward the ground. Traditionally, capsules returned to Earth by parachute, the chutes slowing down the descent. With *Horizon*, the Raptors were acting as our parachutes.

The beeps kept coming, closer and closer and closer together. It wouldn't be much longer.

“Quickly approaching stall speed,” Ashley said.

“Angle of attack?”

“Eighty-seven degrees.”

That felt about right. We were sitting almost upright, the nose of *Horizon* directly above us. Through the observation window I could see only reddish sky.

“Teal, could you set the Raptors' fuel for a little more than half thrust. I want to go up before we go down.”

“Fuel levels set. Engines ready.”

The beeps were now really close together and—one solid beep.

“Engage engines!”

Instantly I felt the thrust as we stopped falling and started to rise up. I could feel it in the seat of my pants. I engaged the OMS to control the thrusters. While the Raptors were keeping us in the air, the job of the thrusters was to move us along so we could touch down at the exact spot the beacon was indicating.

I trusted the OMS and the calculations, but I also had to be the pilot. I had to coordinate the fuel being fed to the Raptors while the OMS controlled the thrusters. The Raptors would let us “float” down to the exact position the beacon was indicating. It had to be a perfect combination of the two, and it had to happen so gently that the ship wasn’t fractured or shattered or toppled over.

“Teal, reduce the fuel mix to the Raptors by 15 percent,” I ordered.

She made the change, and instantly I could feel the difference. We were going down.

“Distance to site is 15,144 feet. Altitude is 3,350 feet,” Ashley read out.

Once again I did a mental calculation as I fed the new numbers into the OMS computer. We needed to travel five feet downstream for every foot of elevation we lost. I was certain we were falling too fast.

“Ashley, what’s the rate of descent?”

“Fifty feet per second.”

That was too fast. If we hit the ground at that speed, the ship would crumble or tumble over.

“Teal, can you increase the fuel feed another 5 percent.”

“Roger that.”

“We’re also getting strong crosswinds,” Ashley reported. “We’re being pushed to the side, and the OMS isn’t reacting.”

I either had to reprogram the OMS or turn it off and do the last bit manually. There wasn’t time for the reprogramming. I’d done this manually four times on the simulator. Two of those times I’d brought the ship in. Once I’d hit so hard the engines had been destroyed. The fourth time the angle was slightly off, and the ship fell over. If that happened now, it would be the equivalent of us falling from the top of a twenty-story building. We’d die in a different way, but we’d be just as dead.

“I’m going manual on the thrusters,” I said.

I expected somebody to object.

“You got it, Houston,” Ashley said.

“We know you can do it,” Teal added.

I wanted to tell them that doing it right two out of four times on the simulator wasn’t the best odds.

The thrusters could be manually operated with a big joystick. The joystick had twenty switches in five rows of four, with each row of thrusters corresponding to a section of the ship. By using bursts from different thrusters, the ship could be moved sideways, the angle and attitude changed. They were fine for moving us in the vacuum of space, but here they were far too small for lift.

I hit different combinations of thrusters to move us toward the beacon. With the first combination, the whole ship seemed to sway. I released those buttons and tried to correct, but I overcorrected, and we rocked far back the other way.

“I can’t see where we’re going.”

“I’ll switch on the cameras,” Teal said.

“Cameras! I forgot about the cameras!”

There were external cameras mounted on the base of the ship, just above the big engines.

The monitor to my left came to life. It showed the ground below. It was mostly flat and completely reddish brown in color. I couldn’t get any perspective on what I was looking at, so it wasn’t going to be helpful.

“I’m going to try to aim the cameras toward the Ground Center,” Teal said.

I had my hands on the joystick, keeping an eye on the gauges and dials while also glancing over at the monitor. It showed the same undefined blur of red—and then I saw it. First the beacon lights and then the supply ships, white and towering in the distance! They held all our supplies, all the fuel, all the tests, food, equipment—and our lives. Forget the dials and gauges. They were what I was aiming for.

Slowly I engaged what I hoped was the right combination of thrusters. We swayed slightly and I eased up on two of the triggers. We settled into a steady, upright flight. We were getting closer, the supply ships getting bigger in the monitor.

“Distance to site is 1,154 feet. Altitude is 450 feet.”

“Speed of descent?”

“Fifteen feet per second.”

“Still too fast. Teal, give 2 percent more fuel to the Raptors.”

Now it was just me, the joystick and the monitor with the camera feed of the Ground Center touchdown site. I wasn't going to think about this as real. This was just another simulation, and I was going to get us down.

I made minor adjustments to correct our approach. Ashley kept calling out the numbers. We were coming in slowly, on a direct line and a good height...but still a little too fast.

“Teal, give me another 2 percent. I need to slow the descent.”

Ground Center was so close now that I couldn't see all the supply ships, and the ones I could see were so close that I couldn't see any of them from base to top.

I let up on the thrusters to slow our speed. Ideally I wanted to hover directly over the landing spot.

I looked at the monitor and was shocked that I couldn't see anything. Then I realized what I was seeing—dust. Exhaust from our engines was hitting the surface and throwing up a thick cloud of dust that was higher than the lower section of the ship and had made the cameras useless for landing.

“I need numbers, and I need them fast!” I snapped.

“Altitude is ninety-three feet, rate of descent seven feet per second, distance is seventy-three feet, and speed is eleven feet per second. We're almost there!” Ashley called out.

I eased up again on the thrusters. We'd be directly over the landing spot in eight seconds and on the ground in seven. That was almost exactly perfect.

“Hang on...hang on,” I said.

I held the thruster positions and counted down from seven in my head, and then there was a clunk and the whole ship seemed to shudder and stop.

“Kill the engines! Kill the engines!”

Everything shut down. There was no sense of motion. No shaking. No vibration. No sound. We’d touched down.

“Welcome to Mars.”

Twelve

“How are you two feeling?” I asked.

“Tired,” Teal replied.

“Exhausted,” Ashley said. “You would have thought gravity would be our friend and help us.”

With *Horizon* sitting upright, we had had to use the ladders to move from section to section, all the way to the bottom. For all our time in open space in weightlessness, those ladders, embedded in the wall, had been nothing more than a series of handles and holds to allow us to propel ourselves forward. Now they were the way we’d gone down from the flight deck to our sleeping quarters and farther below to the hatch in the aft section that would allow us to exit the vehicle. I wasn’t looking forward to the climb back up.

It probably hadn’t helped that after the adrenaline rush of landing, none of us had been able to sleep very well. It was my first night back in my room since the accident in space. There was no need for me to be on the flight deck, monitoring the

instruments, since we weren't flying. We were on the ground. On Mars.

Between yesterday when we'd landed and this morning, we'd had more than two dozen messages from Mission Control. There were the usual check-ins, plus congratulation messages from our families, and they'd also sent us news reports from around the world. We were being celebrated in every country. Suddenly nobody seemed to be protesting the Mars mission.

None of what was happening seemed believable. Behind the sealed air lock was a different planet. If I needed a reminder, I only had to look at Ashley and Teal, sitting across from me in their Mars suits. All that remained was for us to put on our helmets.

These sealed suits, like a normal EVA suit, had a full PLSS—primary life-support system. It protected us from radiation, generated a livable temperature and provided oxygen. The difference was that the Mars suit was built to allow us to walk—and to get back up if we toppled over—and was strong enough not to rip when we fell over or bumped into something.

Falling over was more than just a possibility. We were all going to fall down. Especially in the beginning. Although Martian gravity was nothing like Earth's gravity—only 38 percent as strong—it felt powerful after all our months spent in zero g. And these suits weren't light. Even calculated with Mars gravity, each weighed in at just over eighty pounds.

It had taken us a long time to help each other get into the suits. It was exhausting. We had to check each joint to make sure that the suits were airtight.

“Do you really want us to do this?” Teal asked.

“Positive.”

“But the pilot and commander should be the first one out of the craft,” she said.

“As commander, it’s my decision, and I want the two of you to be the first people to set foot on the planet.”

“Are you sure?” Teal asked. “Everybody knows it was Neil Armstrong who was the first person to set foot on the moon, but who remembers the second person?”

“It was Buzz Aldrin. He was followed by Charles ‘Pete’ Conrad, Alan Bean, then Alan Shepard Jr., Edgar Mitchell and—”

“Okay, but who other than a space nerd like you would know all that?” Teal snapped. “I really think it should be you.”

“I agree,” Ashley said.

“Since I am in command, it doesn’t really matter what you two think should happen. Did you notice that all those people who set foot on the moon were male? Males were first, last and only. I think it’s right for the first person on Mars to be female, and for you two to do it together.”

“It just doesn’t seem right for you to miss your spot in history,” Teal said.

“I have my spot. I landed the first ship on Mars. I’m the commander of the mission. The place for the two of you is to step out and wave to the camera.”

One of the drones, remotely controlled by Mission Control, was now directly in front of our ship. A camera

was mounted on it and was already beaming back live-feed images to Earth.

“You know what you’re going to say, right?” I asked.

“We worked on it last night,” Ashley said. “Do you want to hear?”

I shook my head. “I’ll hear it soon enough. Let’s get out there.”

“Okay, we’ll do it. Besides, it’s probably best that we walk out side by side in case one of us falls down,” Teal said.

I picked up Teal’s helmet. It seemed so heavy. I carefully placed it over her head and spun it until it clicked into place. A little green light flashed on the side to indicate it had been sealed. I repeated the same thing for Ashley, who then helped me with my helmet.

“Can you both hear me?” I asked.

“Loud and clear,” Teal answered.

“Affirmative,” Ashley replied.

“Teal, depressurize the air lock,” I commanded.

She began the process that took the oxygen out of the lock and into the aft section of the ship. With that removed from the lock, we’d be in a vacuum—like in space. The Martian atmosphere would be allowed in slowly until the pressure was the same as outside the ship. I looked at the monitor, which indicated everything was happening as it should.

“Are you both good?” I asked. They each gave a thumbs-up.

This process would take place every time we ventured out onto the surface. Mars’s atmosphere and Earth’s were basically composed of the same main gases, just in very different

amounts. Earth's was 78 percent nitrogen, 21 percent oxygen and less than .04 percent carbon dioxide. Mars's was 95 percent carbon dioxide, 2.7 percent nitrogen and only .13 percent oxygen. That wasn't nearly enough for us to use to breathe, and we'd suffocate out there without our suits.

"We're in a vacuum," Teal said. "I'm now going to start drawing in the outside atmosphere."

We were safe in our suits, but even if we hadn't been in our suits, we wouldn't have noticed anything. Carbon dioxide is colorless and odorless. It is the gas automobiles release and that we breathe out when we take in oxygen. The scrubbers on the ship, as well as the plants, were continually converting that carbon dioxide into air we could breathe.

That conversion process had also been happening here on Mars since the second supply ship had landed. Small robots and rovers had erected an oxygen-extraction tower that was drawing in the Martian atmosphere and filtering out the small quantity of oxygen it contained. That oxygen was being stored in tanks and would be released once we'd erected the greenhouse.

"Atmosphere is neutralized," Teal said. "We can proceed. Last chance. Do you want to go first?"

"Negative. We're sticking with the plan."

"Your choice. Unsealing the lock and opening the door."

Teal worked a series of buttons at the side of the door. As always there was an extra step built in—redundancy—so that it couldn't accidentally be opened. Satisfied, she went to the big wheel in the center of the door. She applied pressure, but it didn't budge.

I had the strangest thought then. What if we couldn't get it open? What if we'd gotten all the way to Mars but couldn't get out, get to the supply ships and the food we needed to survive, and we died right here, starved to death and—

The wheel started turning.

Slowly the door opened. I didn't feel any flutter of atmosphere moving in or out.

"Let's go," Teal said.

She and Ashley linked gloved hands. The passage wasn't wide enough for them to pass through at the same time. Ashley went first, pulling Teal along with her. Then they got onto the stairs and started down. There were twenty steps in total. Together, holding hands and the railings on both sides, they started to descend.

I stepped forward and gazed out at the Martian landscape. It took my breath away in more ways than one. Beyond them on the flat surface was the rover that was filming us, and beyond that, the supply ships soaring up into the sky.

I grabbed the railing and took my first step. My body was heavy, and my knees felt like they might buckle.

"Careful, everybody," I said quietly into my headset. "We don't want the first step onto the planet to be a barrel roll down the stairs."

Ashley and Teal continued until they were at the very bottom step. I paused halfway down. I didn't even want to be in the camera view.

"One small step for humankind," Ashley said.

"And one giant leap for humankind," Teal added.

With that said they stepped off the stairs and put their feet down, together, on the dusty Martian soil. And history would record that Ashley Ling and Teal St. Jermaine were the first humans to set foot on another planet.

Thirteen

Our first full day on Mars had featured the historic first steps of Teal and Ashley, followed thirty seconds later by mine. We'd walked around a bit, waved to the camera, then proceeded back to our ship. That climb up the stairs had been one of the hardest things I'd ever done in my life. If it hadn't been for the adrenaline of the moment and the terrible fear of falling down in front of a few billion people, I wasn't sure I could have made it.

We'd sealed the outer hatch, repressurized the air lock, gotten out of our suits and basically collapsed. It had taken almost four more hours for us to climb back up into our living and eating quarters. Then we'd spent the next three days just eating, hydrating, gaining our strength and letting our bodies adapt to the gravity of the planet.

The first day had been rough. I'd harbored the silent fear that we weren't going to be able to adapt, that we were going to be so weak we couldn't complete our mission. Ashley and Teal had independently had the same thought and hadn't

mentioned it. It wasn't until we started feeling better that we all brought it up.

We hadn't been using the exercise machines since we'd landed, instead using the gravity of Mars as our exercise. We'd made dozens of trips to bring supplies down from the upper decks to the aft section at the bottom. Eventually one of the supply ships might become our primary residence.

Moving around the ship we obviously felt the pull of gravity, but we weren't burdened by the weight of the Mars suits. In fact, most of the time we weren't even in our flight suits but instead were wearing shorts and T-shirts. It felt good to move normally, even though it was moving through a world with a third the gravity of Earth.

On day five we all thought we were ready for the next steps. But as we got back into our Mars suits, and I started to feel the weight of the equipment, I wondered if we were wrong and weren't up to the task.

While we'd only begun to work, the robots and rovers had been doing their jobs since they'd landed months earlier. The drilling rig had been boring into the surface looking for water. The automated weather-monitoring station had been set up. We'd been drawing information from it since before coming into orbit. The drones had started to unload one of the ships. Most of the work we had to do was manual labor—the manual labor of eight astronauts. We were three, and we weren't as big, strong, skilled or well trained as the others would have been. We had to hope that we were determined and strong enough to complete the work.

Ashley and I helped each other with our helmets, locking them into place, then doing final checks of the seals and the radios. Teal was on the other side of the air lock. She was staying on *Horizon* as we headed out.

“The pressure is neutral. You’re ready to open the outside door,” Teal said.

“I’ll get the crank,” I replied.

I turned the wheel and clicked it open, swinging it inward. There was no rush of pressure in or out. It seemed so anticlimactic. I stepped out and started down the stairs, Ashley right behind me.

“What’s the surface temperature right now?” I asked.

“It was thirty-seven degrees Fahrenheit, or less than three degrees Celsius, an hour ago.”

“That’s so warm that if there were water, it wouldn’t be frozen,” I said.

“It will be a lot colder by the end of the day. The temperature is going to drop to minus eighty-one Fahrenheit in the middle of the night.”

We reached the bottom of the stairs, and I hesitated before placing a foot on the red Martian soil. In front of me were the imprints of our first trip. We hadn’t gone far, but there was our little trail, three sets of footprints, that went out toward the rover, where we’d waved, and then back to the ship.

Standing here looking at them, they seemed even more historical. On the entire planet, in the entire history of this planet, those were the first steps ever taken by humans. And we’d taken them.

I felt a little flutter of remorse. I could have been the first person to set foot on Mars. Nobody would have thought badly of me or that I'd overstepped if I'd been the one. Instead it was Ashley and Teal. Did anybody except a few of us "space nerds" know about Buzz Aldrin? And really, I wasn't even the second—I was the third. That made me Pete Conrad.

"What are you two waiting for?" Teal asked. "Are you all right?"

"Good. Fine. Just observing the scene."

I stepped off the ladder and onto the surface of the planet. A little cloud of red dust floated up. Ashley stepped down beside me.

"It's hard to believe," she said.

"Impossible to believe, but here we are. On the surface of Mars."

"This landscape reminds me of Arizona. Have you ever been?"

"Before going to space camp, I'd never been outside of Wisconsin. The farthest I'd ever been was Milwaukee. I guess I've still only been in two other states."

"I've been to thirty-one states," Ashley said.

"And I've been to eighty-four countries." It was Teal adding to the discussion.

"Well, I've also been to the moon," Ashley replied.

"No you haven't. You've been *past* the moon, but you haven't been *to* the moon. At least, not yet. You have been to Mars, but really, that's not so significant. *Everybody* I know has been to Mars. It's *so been there, seen that.*"

I couldn't help but laugh, as did Ashley.

“We are the three most traveled people in the history of the world!” Ashley said.

“We are, but you two do me a favor and travel a little farther...like the three hundred yards to the supply ships.”

“Of course! Let’s get going,” Ashley replied.

“And no talking to strangers along the way,” Teal teased. “Be safe.”

We started moving. Despite the weight of the Mars suit, I had to consciously reduce the length of my stride. My returning strength combined with the lesser Mars gravity gave me a jump in my step. It was easy to bounce, which meant it would be easy to fall over.

We quickly closed the gap between *Horizon* and the supply ships. The surface was smooth, flat, red and dusty. We kicked up little clouds of dust as we moved. I looked back. We were leaving footprints, wavy lines from the bottoms of our boots.

“What are our first tasks?” I asked.

“You’re going to attempt to open the doors and enter each ship to make sure the supplies we need are available to us,” Teal said through the comm link.

“And after that?”

“If you can get all the doors open, that will be a very good first day,” she said.

“Do you know which supply ship has the Mars rover?”

“I know where everything is,” Teal replied.

That was part of her job. She was in charge of the supplies, as well as the order of the tasks we’d do to stay alive.

“How hard would it be to get the rover out?” I asked.

“There are controls to open up whole sections of that ship, and the hull panels become a ramp to roll the vehicle down to the surface. I don’t think it will be too hard.”

“It would be nice to have transportation and make the rest of the work easier,” I said.

“Not to mention going for a little ride,” Ashley added.

“Just think. None of us are old enough to drive a car on Earth, but here we can get behind the wheel,” Teal said.

“Maybe we could make it a rule that the driving age on Mars is fifteen,” Ashley suggested.

“That would mean you’re the only one who can drive!” Teal protested.

“Okay, we’ll go with fourteen,” Ashley replied.

I was aware that the bounciness of my steps was diminishing as we continued to move. Were we attempting too much too quickly? Should we have waited a couple of days more? The supply ships still seemed so far away. Maybe we should just turn around and go back.

I stopped and looked over my shoulder. *Horizon* wasn’t any closer than the supply ships now. We might as well move forward.

“Are you tired?” Ashley asked.

“No...well, yes. Are you?”

“My muscles are almost burning. We might really need that rover.”

“We could turn around now,” I suggested.

“Not really. How would we explain that to our audience?” She gestured toward the supply ships. “They’re just about to see the first part of our walk.”

“I’d forgotten all about the cameras.”

There were a series of cameras mounted around the Ground Center that were livestreaming video. Seventeen minutes after we did anything, those images would arrive on Earth and be seen not just by Mission Control but on a website available to anybody on the planet.

“We’re millions of miles away, and we’re on some strange reality-television show,” she said.

“Consider it a version of *Survivor*, Mars edition.”

Ashley and Teal both laughed.

“Let’s just make sure that nobody is voted off the planet and keep the survivor part going,” Teal said. “Now could you both keep focused? I want you to come back in one piece. Check the ships, get that rover out, and come on back. I’ll fix dinner. Any special requests?”

“I’d never say no to macaroni and cheese,” I said.

“How boring!”

“I’ll take roast beef, and do you think we could have shrimp cocktail as well?” Ashley asked.

Shrimp cocktail was Ashley’s favorite. I found it a little bit too spicy.

“Your wish is my command. Then we’ll make a toast with a truly delicious simulated orange beverage.”

“Roger that,” I said. “We’ll be there as soon as possible.”

“Great. I’ll get out the scissors and cut open your meals.”

We started walking again. Away from Teal and *Horizon*. Toward the supply ships. And toward the cameras. Hello, Earth.

“Smile and wave,” I said. “Smile and wave.”

A little automated rover came to life, and I was momentarily startled. It started to drive away, like it was a small dog that was afraid of us. I couldn't help but smile. It was nice to have something "alive" on the planet other than us. It was being controlled by a technician on Earth, seeing the view from the rover's onboard camera and sending commands that took seventeen minutes to arrive.

The supply ships looked bigger and bigger as we got closer and closer. Five of them stood more than twenty stories tall, and the sixth had deliberately been landed on its side. They were almost identical to *Horizon*, right down to the four support fins that extended from the ship to the ground. Three were strictly to help keep the ship upright, and the fourth fin included a stairway to give us access to the ship.

The primary difference between these ships and *Horizon* was what was inside. *Horizon* was like a passenger train equipped with sleeping quarters, recreational facilities, a galley for eating and, of course, life support. It had water and atmosphere and temperature control to keep astronauts alive. The supply ships were like gigantic freight trains, carrying only cargo, pushed along by the six Raptor engines and smaller thrusters instead of being pulled by a locomotive.

Inside those ships were all the supplies we'd need to eat, live and breathe, and to be shielded, housed and protected from the barren Mars landscape and the radiation beaming down on us through the thin Martian atmosphere.

There was a total of thirty-five thousand pounds of food. That was enough, along with the things we were going to grow,

to keep eight astronauts fed for the eleven months on the planet and the seven-month flight home. Now, with only three of us, there was enough food for about forty months. There was no danger we were going to starve to death—assuming we left in eleven months. Maybe us surviving and leaving were big assumptions.

The food in the supply ships was basically the same as what we'd been eating for the past seven months of the journey and the eight weeks on the space station before that. It included dehydrated beef, ham, scrambled eggs, cereal, soups and macaroni and cheese. There was an almost unlimited supply of nuts, granola bars and powdered drinks, including coffee, tea, orange juice and lemonade.

In the beginning, I couldn't believe how many choices we had. Now, after a few hundred days—and so many hundreds left to go—I was tired of everything and wanted something, anything, different.

"Houston, Ashley, I was thinking about the Mars rover," Teal said. "I believe there's a protocol in place."

"What sort of protocol?" Ashley asked.

"An activation protocol, the same as with the smaller rovers and systems."

"And you think it can be activated by Mission Control?" I asked.

"I've already sent a message to confirm and activate. We'll know in thirty-five minutes or so," Teal said.

"Please keep us advised," I said.

"Copy that," Teal replied. "Stay safe and remember, don't be late for dinner."

The ships towered over us. From a distance they had looked to be side by side. As we closed in, though, I could see how they were spaced out. That made sense. Not only was it unnecessary for them to be clustered beside each other but doing so could actually be dangerous. If there was a fire or one toppled over, separation was a good thing.

I also noticed discoloration. The supports and stairs that extended out at the bottom of the supply ships were stained with red Martian dust. The discoloration extended, although fainter, partway up the sides of the ships themselves.

I looked down at the little puffs of dust we were stirring up with each step. The whole planet seemed like a gigantic sandbox filled with red dust. This dust could be more than an inconvenience—it could disable equipment. Our fear now was that we'd be unable to access the supply ships due to a malfunction that had occurred during the journey or had been caused by the heat of entry or even something as simple as a few particles of red dust.

“Why don't you start with the ship to the far right, and I'll start on the far left,” I suggested.

“Sure...if that's what you want.”

I recognized her hesitancy, because as soon as I suggested separating, I felt uneasy.

“Or we could stick together,” I said. “That might be better.”

“I think that would be better.”

Ashley veered off to the right, and I followed.

“Remember, there's a combination of repeated essentials in every ship,” Teal said.

“Of course, redundancy.”

“In case one ship went off course or didn’t land or crashed,” she added. “But there are specific things on specific ships. And, of course, there were those things that automatically unloaded.”

She was, of course, referring to the rovers and systems that had been deployed and were already working. It was a shame that everything couldn’t have been done that way, because there was a lot of moving, carrying and setting up for us to do. Yuri alone was probably as strong as the three of us combined. I could just picture him laughing and joking and—I stopped myself. I didn’t have the time or bandwidth to do this. I couldn’t let “what if” overwhelm “what is.”

We came to the steps on the ship farthest to the right. Ashley started up, and I trailed behind her. Within a few steps I felt my legs starting to give under the strain. She stopped and turned around.

“I’m feeling it. You?”

I nodded. “Let’s be careful. We can’t afford a fall or an injury.”

“Have you thought about how many times we’re going to have to climb these steps to unload this ship?”

“And multiply that by the number of ships. It’s going to be a lot. Let’s just take it step by step. Keep climbing.”

Reaching the top of the stairs, we came to the door. Ashley opened a compartment to reveal a keypad. She punched in the code and a green light came on, there was a beep, and then the door popped slightly out. We both stepped back slightly to allow her to pull it open. We peered into darkness.

“That’s a good start,” Ashley said.

“I didn’t bring a flashlight,” I said. “Did you?”

“No need.” She stepped through the door and lights came on. “Motion activated. Do we go inside?”

“I think we just do a door check. One down and five to go. Seal it back up.”

I started back down the stairs. I stopped partway down, shocked. The ship beside us had come to life. Lights were flashing, and the side of the ship was starting to open.

“Ashley, Teal, are you seeing that one of the ships has become active?” I exclaimed.

“Roger that,” Teal replied. “I can’t see it, but Mission Control just sent back word that they’d initiated the protocol to offload and activate the Mars rover.”

“It’s opening a ramp,” I said.

“It looks like a banana being peeled,” Ashley added. “Let’s get a closer look.”

We continued down the stairs and I stumbled, my grip on the railing the only thing keeping me from tumbling down. My legs were weak, and for a split second I thought I might have to sit down.

“Careful,” Ashley warned. “It’s a rover, not an ambulance.”

I kept moving by focusing on the stairs and then on my footsteps as we moved toward the ship. By the time we reached it, the ramp was fully deployed. It was steep, with hand railings on both sides, and it extended well away from the base of the ship. We stood off to the side and looked up as the rover appeared and started down the ramp. This was

all being controlled by a technician back on Earth, using a specific offload-rover program.

The rover was gleaming white, with five big bronzed triangular windows, set atop eight big black tires. I'd seen a mockup of the rover back at Mission Control but had never been in it or even close to it. There had never been a need. Who would have thought we'd ever be in a position to see one in real life? Or, now, to drive one?

I realized I knew virtually nothing about how it operated or even how to open the door to get inside. All my time had gone into getting us here and onto the ground without crashing. Wait, was this something Ashley had studied?

The rover rolled off the ramp, continued another thirty feet and then came to a stop. We walked up to the side of it. I stopped, and Ashley kept moving. She reached up and opened a compartment that was similar to the one on the ship's entry. It revealed another keypad.

"Not sure why they think they need to guard everything with a password," she said.

"Probably expecting alien teenage joyriders," Teal piped up. "They should have mentioned that in the briefings."

The door opened like a wing lifting up. A two-step ladder slipped down, and Ashley used it to climb in. I followed in her footsteps, climbing in and taking the seat beside her. She was sitting at the wheel, and the dashboard was filled with complicated controls that I had no idea about.

Ashley pushed a button and the door swung shut. There was a loud buzz followed by an equally loud click. A green

light flashed on the dashboard.

“Seal intact,” a computerized voice said.

Ashley started to push other buttons and turn dials.

“I assume you know what you’re doing?” I asked.

“This was part of what Teal and I were doing on the simulator while you were working on getting us down to the ground.”

“Good to know. By the way, what’s that hissing sound?” I asked.

“I’m using the pumps to evacuate the Martian atmosphere from the cabin and create a vacuum. Then I’ll open up the storage tanks and replace it with an atmosphere so we can remove our helmets and still breathe.”

I sat there and waited as Ashley took care of things. It felt strange not to know what she was doing but also reassuring that I didn’t need to know. I had faith in her, and it felt good to not have to do anything. I simply looked out the windows.

In the distance, beyond the flats, beyond *Horizon*, were towering remains of volcanoes and mountains. Lifeless signs of what used to be a planet that was alive. We were probably sitting on the bottom of a dried-up seabed. What creatures had once swum in those waters or walked on the surface? Would humankind ever find proof of life? Would *we* on this mission?

The little rover that had raced away from us earlier in the day had been going out to take soil and rock samples. What if one of those rocks contained a fossil? A seashell the size of my little fingernail could either change or confirm our entire concept of the universe and our own beginnings.

The vehicle rumbled, and I startled out of my thoughts. I turned toward Ashley. She had already removed her gloves and removed her helmet as I watched.

“You can take off your helmet,” she said. “Let me help.”

She reached over and undid my gloves, one by one, and then turned my helmet. It clicked and she lifted it off. She placed it on the floor between us.

“Thank you. I’m feeling really tired.”

“Sit back and relax. I’ll have us home in no time.”

“Wait! We only checked the one supply ship.”

“That’ll have to wait until tomorrow. It’s time for dinner. And to lie down and go to sleep.”

Fourteen

I took out the last screw and pin and then reached up and took down another of the ship's support ribs. It was a section about six feet long and six inches wide, made of a magnesium alloy. The alloy was as light as aluminum and as strong as titanium. It had the strongest strength-to-weight ratio of any material known to mankind. This rib would have only weighed about twenty pounds on Earth, and here on Mars it felt more like seven.

"Here you go," I said as I turned and handed it to Teal.

She brought it over to an open air lock.

"Ashley, clear below?" she called out.

"I'm well away. Go ahead."

"Copy that," Teal said.

She threw it out the opening. I pictured it flying through the air and landing in the dust sixty feet below. We weren't worried about the ribs being damaged in the fall because they were, after all, constructed of the strongest metal ever made.

We'd decided it was a lot better doing it this way than carrying them down the stairs and then hauling ourselves back up. Doing that trip once or twice would have been all right, but we were in the process of moving over six hundred pieces. It had taken us almost three days but we were down to the last few. These ribs had contributed to the structural integrity of the ship. Now they were going to be the support beams of the greenhouse we were constructing.

Ashley, waiting below, took them over to the site of the greenhouse. Once they were all at the site, we'd work as a team to put them together. And while we were all members of the team, Teal was in charge. This was part of what she'd studied on the trip here, taking on what would have been Colonel Kim's domain.

Basically this was like a gigantic build-a-greenhouse Lego set. I loved Lego, but then, who didn't? The biggest challenge was that we were doing it while wearing our heavy Mars suits, which included cumbersome gloves. Despite the climate control in the suit, my fingers were getting clumsy and numb with the cold. And it would only get worse as the sun started to go down, and with it, the temperature. In the middle of the night, it would drop down to minus eighty degrees.

We were stripping down just one of the ships for the greenhouse. Each of the six supply ships had been constructed with similar support ribs. The plan had been for the crew to build numerous structures. Ultimately all the ribs on all the supply ships would have been used to construct those structures. Not anymore, though, not with just the three of us.

Building all of those structures was just one of many tasks we wouldn't be able to complete.

So much of what had been planned for our crew had been reduced out of necessity. We didn't have the time, talent or training to carry out many of the tasks and experiments of the mission. Back at Mission Control they were dividing the tasks into categories. Some were essential. Either they were needed for our survival or for leaving the planet. They included setting up and maintaining the solar panels, which wasn't tricky. Other tasks were beyond our skill set now, but we would be taught. These included how to assemble the components necessary to create fuel and oxygen and ignite it.

Other tasks were optional but would be nice to accomplish, and they often used skills we possessed. These involved reading instruments, gathering soil and rocks, and monitoring the weather equipment.

On top of all that, we had to continue to do medical testing of ourselves. In the time since the accident, Teal had become pretty good at taking blood samples and using simple medical equipment like the scanners that tested our bone density. She was, more or less, and for better or worse, our medical specialist. A fourteen-year-old "doctor" wasn't what anybody would choose. Then again, a fourteen-year-old spaceship pilot also wasn't anybody's concept of a good idea.

"How are you feeling?" I asked Teal.

"Tired. You?"

"Tired and thirsty," I replied.

While we were in our suits, we had no way of drinking. And despite the low temperature, we were all working up a sweat. There was condensation in the face shield of my helmet, and my feet felt soggy.

“Ashley, how are you doing?”

“More than tired, but let’s push on. How many more sections do you have to do?”

“We’re down to the last six,” I replied.

“Once we’re through with those, we’ll go into the rover and take a break to eat, hydrate and warm up,” Teal said.

“Whatever you say, Commander,” I replied.

“I’m saluting as we speak,” Ashley joked.



It had been a long day. The sun would go down shortly, and we needed to get back to the ship. Teal had already headed back to file communications with Mission Control, leaving Ashley and me to finish up the bolts on a few more of the ribs.

We’d worked for almost five hours, assembling three pieces into triangles and then attaching the triangles to each other to create a circular structure. On top of that base was a second row still to be connected, creating a ten-foot-high skeleton of the greenhouse walls. We’d managed to finish the entire bottom part of the circular structure, including a place where an air lock was to be installed to allow us in and out of the greenhouse.

The next day and during the days to follow, we’d be working to finish the top section, and then we would wrap the skeleton with a “skin” made of a special material. It was like plastic but

infused with metal filaments. It was thin and incredibly strong, and the skin it formed would function as solar panels. It would gather in the rays of the sun and convert them to electricity to power the heaters in the greenhouse.

Once completely sealed, we'd attach the unit that was harvesting usable, breathable gases from the Mars atmosphere. It would create a climate—both air and heat—that would allow plants to grow and enable us to be inside without wearing suits or helmets.

The final step would take place after that, when hydroponic-plant walls would be installed. The plants required no soil, just drips of water, and by creating walls of them we had vertical as well as horizontal growth platforms. With the whole crew, this would have been assembled and functioning long before now. But we weren't the whole crew. We were just doing what we could.

Of all the work we were doing, constructing this greenhouse was probably the most important. We were trying to show that we could do more than just visit Mars, that we could live on the planet. The ability to grow food—to be self-sufficient—was a major step in settling the planet.

I was looking forward to the day I could walk around inside the finished greenhouse. I'd have Mars soil at my feet and no Mars suit, and I'd be freely breathing the fresh air the plants were producing. It was going to be a little Garden of Eden on the planet.

This greenhouse was just the beginning. In the future thousands of acres of the planet would be covered in advanced

versions of our structure. That would be decades in the future, and at fifteen years of age, I could realistically be part of that future. It would be a time when tens of thousands of people would live and work here, give birth to babies, raise children and even pass away of old age here.

I'd spent time wondering about that first settlement and the satellite settlements that would extend out from it. I'd even wondered what they'd call it. Would it be Ashleyville or Teal Town? I had a little tinge of envy and remorse. It could have been me. I could have been the first person to set foot on Mars.

"I can hardly feel my fingers," Ashley said to me.

I turned toward her. "Yeah, I'm having trouble using the tools."

Ashley flexed her fingers. "I think we should stop for the day."

I didn't answer.

"I know. I don't like stopping before finishing either," Ashley said. "Maybe we could do one other task before we go back to *Horizon*. Let's head to the rover."



I sat in the rover, the engine rumbling, and waited for the atmosphere to stabilize before taking off my helmet and gloves. I was bone tired, and it felt so good to just sit. The warmth of the heaters was already starting to seep up from the seat and through my Mars suit.

The lights flashed green, and the little computer voice told us it was safe. Ashley and I started to remove our equipment.

We both began with our gloves. I removed the first one and looked at my hand. My ungloved fingers looked so fragile and foreign. I turned my hand over and rubbed my thumb against my fingers.

“Are you all right?” Ashley asked.

“Good, fine.”

She’d already taken off her gloves and helmet. Without saying a word, she reached over and placed her hands on my helmet. She turned it to the left, and I heard the loud click before she removed it, placing it on the floor at my side. I took a deep breath. The air felt clean and cool.

“Here, let me get your other glove,” Ashley said.

She turned the glove to the side. It clicked and then Ashley removed it, handing it to me. She took my hand in her hands.

“How are your fingers feeling?” she asked.

“A little numb.”

“This should help,” she said.

She started to rub my fingers. “This brings back circulation. We should probably shorten our times outside unless the temperature is higher. How does that feel?”

“Good. Really good.”

It did feel good...but also strange. I felt uneasy, nervous, uncomfortable. Yet I didn’t want it to stop.

“I guess this isn’t the way you expected to celebrate your fifteenth birthday,” she said.

“Not what I had in mind.”

After we’d gotten up that morning, they’d sung “Happy Birthday” and given me a cupcake with an unlit candle.

Apparently this was now part of our traditions on this mission. There had been greetings from my family and from Mission Control. All of it seemed long ago, even though it was only that morning.

“You have the honor of having the first birthday on the planet,” Ashley said.

“And you had the first birthday in orbit around the planet. Strange to believe that was six weeks ago.”

“I agree. I can’t decide if it was six weeks or six years or not even real.”

“None of this seems real. Day by day we’re getting by, and today is our thirty-sixth day on the surface.”

“If you add in the 14 days in orbit that’s 50 of the 336 days before we head home,” she said.

“I think today definitely goes into the win column.”

“We did a lot better than we could have when we landed. We were pretty weak.”

I laughed. “Those first few days were rough. I knew we’d eventually adapt and gain strength, but I had trouble believing it in the beginning.”

“I know. What your head knows and what your heart tells you are sometimes very different things.”

“That’s very poetic,” I said.

She released my hand, and I felt relieved and disappointed at the same time.

“Let’s go check on the soil rover,” Ashley said.

Mission Control had messaged earlier in the day to say that it wasn’t responding to their commands. They believed it

had become stuck in a hollow or hung up on some rocks. Thank goodness the rover wasn't far away—it was no more than a mile from Ground Center when it happened. Then again, that was a lot farther away than we'd ever been from the safety of *Horizon*.

"The GPS signal shows us right on track," Ashley said.

"Good to know. We don't want to get lost, because it's not like we can stop and ask somebody for directions."

We were running our guidance system off a satellite that had been positioned in geostationary orbit. That meant it was always directly above us. Since the orbit was so high, it allowed us to communicate almost twenty-four hours a day with Mission Control. There was only a three-hour period each day when we were facing completely away from Earth and communication wasn't possible. At this point in our orbit around the sun, that gap was in the middle of our Martian night, when we were asleep and really didn't need to communicate. Still, it had seemed a little eerie that we were completely isolated and unable to reach them.

There was also a slight difference in the length of a day on Mars and on Earth. A Mars day was twenty-four hours and thirty-nine minutes long. We were trying to live on the Mars cycle, but with each day we got almost an hour out of sync with Earth. This also disrupted our natural body cycles. At the end of the month, we'd have missed the equivalent of a full night's sleep.

"There it is!" I exclaimed.

The rover was up ahead. It wasn't much bigger than a children's wagon. It was covered with bronze-colored solar panels,

and in the fading light it blended into the background.

As we closed in, the problem became obvious. As Mission Control suspected, it had bumped up onto some rocks, and the back wheels—the source of its mobility—were hanging above the ground. The rear wheels were spinning, trying unsuccessfully to escape. The communications grid spun around toward us, like it was offering a greeting. Our arrival was now on camera, and in eighteen minutes the controllers at Mission Control would know we were there to save it.

Ashley slowed down and moved us over to the side so that the soil rover was directly in front of us.

“I’m going to activate the arm,” Ashley said.

She worked the controls and lowered the mechanical arm of our rover toward the ground. Then she eased us forward and to the side ever so slightly, until the arm was in line to give the rover a nudge. We stopped moving, and she slowly extended the arm and shoved the rover forward. It bounced off the rock, the rear wheels hit the ground and it started racing away!

Both of us cheered!

“In eighteen minutes there are going to be some pretty happy people at Mission Control,” Ashley said.

“Especially the technician who put it up on the rocks,” I added. “I guess it’s time for us to get—wow.”

I had looked up and up at the horizon. “It’s amazing. Look.”

The sun was about to set. I knew it was the sun, and I knew it would be this color, but it was still almost unbelievable.

“It’s such a beautiful shade of blue,” Ashley said. “And the sky is so purple.”

“The fine dust particles suspended in the atmosphere are the right size for the blue light of the spectrum to penetrate a bit more efficiently.”

“I guess I shouldn’t have expected a poetic response from you,” she said.

“Sorry. It is really, um, romantic.”

She laughed. “A lot of good that’ll do me. There are only three of us on the entire planet, and I’m the odd person out.”

“What do you mean?” I asked.

“Come on, Houston, it’s always been the two of you.”

“In the beginning it was,” I said. “You have to admit that you didn’t like me any more than I liked you.”

“I hated you. You were so smug and thought you were so smart and—”

“And I reminded you of you,” I said, cutting her off.

“And you reminded me of me. Yes. Anyway, it wasn’t me on the roof of the space-camp building with you. It was Teal.”

“That was a long time ago.”

“I know you’ve kissed her since. Before liftoff and I know something happened on the space station. Did anything happen on *Horizon*?”

I didn’t know if Teal had told her or not. Was this a test? I nodded. “But now we’re all on the same team.”

“Same team but not the same. It always feels like I’m the third wheel. Like when you two are working together on the supply ship, and I’m working on the ground by myself.”

“You’re the one who volunteered to be on the ground!” I protested. “And besides, it was me and you up on the ISS.”

“It still felt like you were closer to her even then.”

I didn’t know what to say next. We sat staring out the window in silence as the last sliver of the blue sun started to disappear below the horizon. I needed to break the silence.

“Do you know that because of the dust the Martian twilight is longer than twilight on Earth?” I asked. Okay, not brilliant, but I’d said something.

“Do you know that I’ve never kissed anybody?” she asked.

Not the response I was expecting.

“I didn’t know that. It’s not like I’ve kissed many people either.”

“You’ve kissed the only other person on the entire planet. We’re on Mars, 195 million miles from Earth right now, in constant danger and fear of dying, and I may never ever get kissed.”

“Well, there is one possibility. If you’re okay with it,” I said.

I leaned across the open space between us and she moved closer. We pressed our lips together and we kissed. We moved apart.

“Was that a mercy kiss?” she asked.

“It isn’t like I haven’t thought of it before.”

“You have?”

“Look, this is embarrassing. I’m fifteen as of today, and—”

I heard something. A faint voice. Ashley’s eyes widened. She’d heard it too. Then we both realized it was coming from our helmets, which were sitting on the floor. It was Teal calling us.

"I forgot to switch to the rover communications system!" Ashley exclaimed. She hit a couple of buttons. "Teal, this is Ashley."

"Where are you?" she demanded. She sounded scared.

"We're in the rover," I answered. "We went out to rescue the soil sampler. I'm sorry we didn't tell you."

"And I forgot to change over the communications from our helmets to the rover. I'm so sorry too!" Ashley added.

"You both *should* be sorry. When I couldn't get you on the radio, I thought that you were—" She started crying.

Instantly I felt terrible for putting her through that.

"We're coming right back, right now. We're okay," I said.

There was no answer for a few seconds. Then she spoke. "I'm just glad...glad that you're both okay."

"We never should have worried you like that. It'll never happen again. I promise," I said.

"We'll be there in less than fifteen minutes. See you soon," Ashley said.

"Okay. Good. Out."

The communications went dead.

"That was bad," I said.

"Do you mean the kiss?"

"No! That was good. I mean everything else."

"Of course, that was wrong."

"Actually, if I didn't know...it didn't seem like that was your first kiss."

She chuckled. "And that was the first kiss on Mars. It was the first kiss on Mars, right?"

“My first,” I said. “I wonder if that eventually finds its way into the history books. *And on September 19 the first interplanetary space kiss took place.*”

“They’re going to be studying this in school for sure,” she joked. “You’ll become the first person in history to have kissed every single person on an entire planet.”

“That sounds much more impressive than it is.”

“Now if we could get back to Earth, I could get kissed on a second planet...not by you...not that it wasn’t nice or that—”

“I understand,” I said. “How about for now we keep this out of the history books and don’t put it in the daily report back to Mission Control?”

“Maybe best we don’t tell anybody.”

There was only one other “anybody” to tell. It was probably better not to tell Teal.

“Our secret kiss,” I said. “Come to think of it, that does sound sort of romantic. A twilight kiss under a setting blue sun and purple sky.”

Fifteen

We'd just finished up breakfast. I'd had cereal and orange juice, and the two girls had a couple of granola bars and water. We'd also had a little side serving of fresh lettuce. It was our first meal at what we were calling our "summer cottage." It was one of the supply ships. We'd taken over the aft section, closest to the ground, and closed the air lock leading to the section above. With the section sealed off, we'd been able to create a breathable, livable atmosphere and temperature. It wasn't much, but we'd taken three cots to sleep on and some extra blankets to use as walls to create individual sleeping areas. There really wasn't much privacy, but I liked sharing space. On an entire planet with nobody else, it was nice to have the other life forms close by.

Ashley and Teal had gone on ahead while I cleaned up our breakfast mess. It was my turn. I now traveled along the corridor that led from the supply ship to the greenhouse. It was six feet wide and the same height, but it felt so spacious

because it was more than forty-five feet long. We'd connected the supply ship we were living on and the greenhouse with this corridor. The air was good, and there was enough warmth that we could get by with sweaters on top of our flight suits. No clumsy Mars suits, helmets or life-support system necessary.

I entered the greenhouse. Teal and Ashley were busy tending and picking. Our first crops had come up so quickly. We had lettuce, green beans, cucumbers and tomatoes. Salads were included in every meal, including breakfast. I'd never thought a salad could taste so good. But basically anything fresh and not dehydrated tasted wonderful.

"We have too many cucumbers," Ashley said.

"Too many Martian cucumbers. Who would have thought that was possible?"

Under the protective umbrella of the wrap, the plants were flourishing. It had taken less than forty-five days to go from seed to usable crop. And we weren't just growing and eating produce but were also counting and calculating it. This was one of the experiments, to see how crops could be produced. So far we'd turned projections on their heads. It had been believed that this amount of land would produce less than half of what we'd been harvesting.

It was a winning combination of ultraviolet lights and heaters powered by the solar wrap, plus the hydroponic soil, with lots of nitrogen as fertilizer mixed in. The scrubbers had been reprogrammed to strip out not only the oxygen but also the nitrogen from the Mars atmosphere. We'd taken a barren stretch of the Mars surface and turned it into the Garden of Eden.

“Are we going to go back to *Horizon* tonight?” I asked.

“We were just talking about that,” Ashley said. “We were thinking that the sleeping quarters over here aren’t as comfortable, but they’re closer to where we have work to do each day.”

“And we don’t have to suit up and go through two air locks,” Teal added.

“You got my vote.”

We’d had conversations about how being here could be eerie. Somehow *Horizon* seemed safer, more protected. It was all just an illusion, of course. It was easy enough to let our imaginations get the better of us. A little glimpse of light reflecting off a visor or the wind kicking up a puff of dust could lead to all sorts of thoughts. More than once I’d turned my head or spun around thinking I was being watched.

Of course, we *were* being watched. There were cameras both inside and outside that were beaming video back to Mission Control and from there, selectively, to anybody who wanted to watch. It could make you a little paranoid, knowing you were constantly being observed by billions of people. A little paranoid but also comforting. As comforting as millions of miles away could be.

You couldn’t help but fill in the blanks, the emptiness of the planet, with images from your head. I really wished I’d never seen the movie *Aliens*. Or *The War of the Worlds* or *Independence Day*. *E.T.* was all right, because the aliens were nice, and *Men in Black* had friendly aliens too—or at least the ones that weren’t trying to wipe out humanity.

That was the thing. There probably were aliens out here somewhere. Given the vastness of space, the uncountable stars, the unthinkable number of planets around those stars, it was only reasonable to think we weren't alone in the universe. Hopefully, we *were* alone here.

"You know we could make the sleeping accommodations better by bringing more things over from *Horizon*," Teal said.

"We could even open up another section of the ship to give us more space," I suggested.

"Do we need to ask Mission Control first?" Ashley asked.

"It's better to just do what we want and tell them later," Teal replied. "It's not like they can really do anything about it if they disagree."

"Technically they *can* give us orders, Captain St. Jermaine," I said.

"Technically *you* can give us orders, Commander Williams, but that doesn't mean we're going to listen to you either."

"Point taken. What's on our schedule for tomorrow?" I asked.

"The usual for a start. Exercise and work in the greenhouse and cleaning solar panels. Plus tomorrow is medical testing," Teal replied.

"Wonderful. My favorite thing."

"Do you think I like drawing blood and taking urine samples?" Teal asked.

"At least it's only once a week now," Ashley noted.

"I also have to attend a lecture about the warning signs

and treatment after exposure to extreme heat and frostbite,” Teal said. “I don’t think I should skip that.”

“Best not. Let’s not tempt fate.”

Teal was really taking her training seriously. She was being taught how to deal with many health situations, from setting broken bones to using the more complicated medical equipment. Along with the laboratory equipment for testing blood and urine, we had a defibrillator, an X-ray machine, a surgical theater and a CT scanner. Teal was now trained in how to use all of them. She was watching seminars and lectures, receiving direct teaching from doctors at Mission Control and using simulations we had in our computers.

“Were you thinking about bringing over the beds from other rooms on *Horizon*?” Teal asked.

The “other rooms” were those that had belonged to the lost members of our mission. I nodded. “I was thinking that would work,” I replied.

So far we’d avoided changing anything in those rooms or even going into them at all. It just seemed wrong. But we had been told now that we were to go through the entire ship prior to our launch and remove all items deemed “excess.” Mission Control wanted us to make the ship as light as possible so that we’d need less fuel on liftoff and would have more available for course adjustments during our flight home. That made perfect sense.

It also implied that they were worried we’d need more course adjustments. That also made perfect sense. We not only had to blast off and get into a Martian orbit but also had to

leave that orbit at the split-second right time and angle in order to get back to Earth. Being off by even a small percentage of a degree would—if not corrected—cause us to miss Earth by millions of miles. It was better to have the extra fuel available for those course corrections than using it to blast furniture into space.

Most of what we stripped from the ship would simply be left outside on the planet to be battered by the storms and ultimately buried in dust. Things that might be of use for future missions were to be taken to one of the supply ships and stored. You never knew when something simple might be essential, and it wasn't like you could go to the corner store to pick it up.

“Mission Control also wants us to find the time for that extended rover mission,” Ashley said.

There was a site about eighteen miles away that was of interest to geologists at Mission Control. Satellite images and ground-penetrating radar had identified it as a possible site where water had been on the surface most recently. The automated drilling equipment hadn't discovered any water. The presence of water would offer geologists a best guess as to where there could have been life in the past and how to support human life in the future..

Our little soil- and rock-retrieving rover was technically capable of going that distance, but the difficulty was navigating the rough terrain. The rover was remotely controlled from Earth, so by the time an obstacle or danger that hadn't shown up on satellite mapping appeared on camera, it would be close to forty minutes before the rover could be given a command

to avoid it. This was how it had become hung up on the rocks before.

“It will take the better part of a day to get there and back,” Ashley said.

“I could stay at the Ground Center and do the maintenance work if you two want to go and do that,” I suggested.

“That might be fun,” Teal said. “Girls’ road trip.”

“Now I really don’t want to go,” I joked.

“That’s good, because I think you were just uninvited,” Ashley said.

I held up my arms like I was surrendering. I really didn’t want to go. I’d thought none of us did. It was far from here. Ten times farther away from Ground Control than any of us had ever traveled. I had thought about telling Mission Control no and pulling rank as commander to cancel the trip.

I was also still acutely aware of what Ashley had told me about feeling like a third wheel. I’d made a point since then, when something had to be done by two people, of suggesting that she be one of them. And I really thought it would be better if it weren’t the two of us.

There had been awkwardness between us after the kiss. It had gotten better, but it was still there. At first Teal had even commented about us seeming “strained,” and we’d just brushed it aside. I felt guilty for not telling her but not guilty enough to actually tell her.

“Why don’t we go today?” Teal said.

“Today?” I asked.

“Why not? It’s still before nine, and sunset isn’t for another

ten hours or so. Isn't that enough time to get there, gather the samples and get back?" she asked. "That would work, wouldn't it, Houston?"

I did a quick calculation of traveling time and how long it would take to do the work. I added time to account for such variables as changing direction if they encountered obstacles. There would be much more than enough time for the trip, even building in a margin for error in my calculation.

"Ashley could drive, and I'd ride shotgun."

Teal reached out and the two of them did a high five.

"Yeah, you might be able to go..." I wanted an excuse for them not to do it. "But first we need to communicate with Mission Control and get their approval, and that could take a couple of hours."

"They've ordered us to do it, so we *are* following orders. Besides, they leave day-to-day decisions to us," Teal replied.

"We'd also have to make sure there isn't a storm coming," I added. "You wouldn't want to be out there in a dust storm."

"I checked the monitors and satellite reports first thing this morning, the way I always do," Ashley said. "There isn't a storm in this entire hemisphere."

"Anything else?" Teal asked.

"You do seem hesitant," Ashley added.

"Just trying to be careful. You know, a commander taking care of his crew."

"Are you sure? It sounds like you're disappointed that we're not bringing you along," Teal joked.

"Protocol means one of us has to stay on base. You know that."

“Does that mean you want to go along instead of me?” Teal asked.

“If you want me instead of you, then you have a pretty strange idea of what a girls’ road trip would look like,” I replied.

“Well then, Commander, what’s the word? Are we going today or what?” Teal asked.

“I guess it’s a go.”

Both girls hooted in approval.

I was happy for them. And worried. We’d never been more than two miles away from the Ground Center or from one another. Rover trips had been short and circular. Ashley and Teal were going to travel at least forty miles round trip—assuming they could find a route that was relatively straight. If something happened, it wasn’t like they could call AAA.

“I’m sure you’ll have a great time,” I said.

What else could I say? At least they’d be together. And maybe it was better to have the trip happen immediately rather than wait and worry about it for a few nights. The worrying wasn’t just about what could happen to them but what it would be like to be here alone. After all, it wasn’t just movies like *Aliens* that I’d seen. I’d seen *The Martian*. If something happened to them, I’d be alone on the planet, and I was no Matt Damon.



It had taken less than an hour to get the rover ready to go. We’d gone over the route, gotten into our Mars suits, double-checked all systems, especially communications, and loaded on two additional air canisters, each of which could provide

thirty minutes of oxygen. The added oxygen was me being paranoid. The rover had its own scrubbers and could continually recycle the atmosphere. They could be gone for a month and have breathable air.

Teal tossed a pack into the open door of the rover. It contained three complete meals and a day's supply of water. It was much, much more than they'd need for a six-hour trip, but, as always and as per SOP, I was building in a margin of error.

I watched as they climbed in and the door swung down and shut. I stepped back.

"Could you do a final systems check?" I asked.

"How about if we do that while we're on route?" Teal asked. "That way we can be safe but not delayed. If something is wrong, we'll still be close at hand."

"Makes sense." It was hard to argue with.

Besides, I didn't want my being overcareful to burn up too much of their daylight, even though I knew they didn't actually need daylight. The rover had powerful lights and GPS to bring them back even if was pitch black.

"I want you to radio in your status every hour on the hour," I said.

"I think he's saying he's going to miss us," Ashley said.

"Or he's afraid of being alone," Teal replied.

"It could be both of those," I said. "Please be careful, that's all I'm saying."

"Yes, Mother," Teal said.

Suddenly there was silence. Mother? Neither Ashley nor I had one anymore, and Teal never really did have one.

“Okay, bad example, but aren’t you being a little overcautious?” Teal asked.

“This is Mars. Better twice as often as needed. Radio in.”

“Roger that. We’re off,” Ashley said.

The rover came to life. In the thin Martian atmosphere I heard the humming of the engines through my helmet’s comm link, and the rover started rolling forward. I waved, although I couldn’t tell if they saw me or waved back.

“Don’t forget to do the systems check,” I said.

“And don’t you forget to take care of the greenhouse,” Teal said. “Clean up a little, and make us something special for dinner.”

“I’ll take care of my part. Just be safe.”

I stood and watched as the rover moved away. It left behind a trail of tire tracks. It was like two ribbons, a slightly different shade of red, that stretched out behind them as they moved. The air was so still that the tracks weren’t being disturbed. This was good and confirmed the weather prediction. Not only was no storm brewing but there was complete calmness in all directions for hundreds of miles.

I continued to watch the rover retreat into the distance. The ground was so flat that I could have followed its progress for a long time. I didn’t want to do that. I was going to go inside and let Mission Control know what was happening. In the back of my mind, I was hoping they’d scrap the trip. It would take more than forty minutes for that order to come back, but the rover would still be close enough to turn around. It didn’t feel right—but that was just me being overly

careful. And a little bit paranoid. And scared. For them and for me.



I'd taken the portable blower and was working my way around the perimeter of the greenhouse, using pressurized air to blow dust off the sides. Martian dust was like sand at the beach—it seemed to get into every little crack. The difference was that the soil here was so fine it floated well into the air, driven by any gust of breeze or motion. If we didn't dust off the walls every few days, the accumulation reduced the amount of power the solar panels could generate.

It made me wonder how long this base would last after we left. How long before the dust covered it up, or the storms tore it to pieces and even caused the ships to fall over? Would it be decades or centuries? Sometime in the future, would aliens come here and discover these remains of life and think we were Martians? Would they go on to Earth and find it a lifeless planet as well, and search for signs that it had once been alive?

“Ground Center, this is the rover, checking in,” Teal said.

“Copy that,” I said. “Anything to report?”

“We're moving forward but slowly. We had to detour from our route to the north to go around a ridge.”

“How big was the ridge?”

“Only a few feet tall. That's probably why it didn't show on the satellite mapping. We didn't want to take any chances going over it. We thought you'd approve that.”

“Safety first. What’s your ETA?”

“Less than an hour.”

That would put them there by one o’clock, so they’d complete sampling in a couple of hours and be back here by five. There’d still be two hours until dusk and another hour of twilight after that. Plenty of time, with a margin for error built in.

“That sounds good. Keep me updated.”

“We had a question. Have you checked in with Mission Control again since we last talked to see if it’s still okay for us to be out here?” Teal asked.

I heard Ashley laughing in the background.

I’d told them in our first check-in that I’d done that. I’d thought it important to let Mission Control know and also let Ashley and Teal know that it was an approved trip. Instead Teal, encouraged by Ashley, kept giving me a hard time about being “sucky.”

“No, but I will be updating them again and requesting that they send me more cooperative and respectful crew members. Ground Center, out.”



I kept glancing at my watch. They should have checked in with me a few minutes ago. They’d arrived at the site as scheduled and said they were getting into their Mars suits and going out. I told myself it had probably taken them longer than expected to get the samples, get back into the rover and remove their Mars suits. No need to worry.

The mission was to collect both rock and soil samples. Samples would be taken from the surface, but Ashley and Teal would also use a portable drill to go down three feet and, if possible, six and then nine feet. I kept thinking about how our entire world belief system would change if they found one fossil in those samples.

Scientists figured there hadn't been water or life on Mars for 4 billion years. The oldest fossils found on Earth were about 3.4 billion years old. It was theoretically possible that Ashley and Teal could find a fossil here.

"Hello, Ground Center, can you read us." It was Teal.

"Copy that. I can hear you, but you sound strange... muffled."

"I'm talking through my helmet."

I could also hear the rumbling of the rover. Were they driving while they were still wearing their Mars suits? It wasn't necessary, since they had plenty of time to remove them.

"You're only a few minutes late. Repressurize the rover and then get back to me once you've removed your helmets."

"Houston, we have a problem."

"Yeah, right. If you're going to use that quote, at least do it correctly." I'd heard the joke my whole life. The least they could do was say it right. "It should be, 'Okay, Houston, we've had a problem here.'"

"If you insist. Houston, we've had a problem here," she said.

"Quit joking around."

"She's not joking, Houston." It was Ashley. Her voice was muffled as well.

“We can’t get the door of the rover to close,” Teal said.

“What?”

“The door will not seal. We cannot initiate a lock.”

“But if you can’t seal the door, you can’t pressurize the cabin. You can’t remove your suits!”

“That’s our problem,” Teal said. “Or at least part of the problem. Our suits are down to 20 percent of life support.”

Why weren’t they fully charged before they went outside the rover? Hadn’t they been charging them during the trip? I wanted to scream out that question, but there was nothing to gain by doing that.

She continued. “And even with the additional canisters we have about seventy-five minutes of available oxygen.”

“But you’re slightly more than three hours away from here,” I said.

“And that, Houston, is the problem,” Teal said. “We’re going to run out of oxygen before we arrive. We’re hoping you have a solution.”

Sixteen

“Mission Control, this is Houston. I’ve loaded the soil rover. Please send it immediately along the plotted route. Confirm and transmit message. This is Houston, out.”

I’d told them the problem, the solution I was pursuing and the part I needed them to play if the plan was going to be successful. In eighteen minutes they’d get my message. In another eighteen minutes their message would arrive back at Ground Center, but I wouldn’t be here to receive it. I didn’t have time. Ashley and Teal didn’t have time. Once I was on route I’d be away from the communication module and in radio silence from Mission Control and the rover.

I’d strapped two oxygen canisters onto the top of the soil rover. If it managed to get as far as the Mars rover, those two canisters would get Ashley and Teal the rest of the way back to Ground Center. As it was, those two canisters were pushing the weight capacity of the soil rover and partially blocking the solar panels. This would slow it down and limit its range

to about seven miles. Its route had been plotted to follow the Mars rover's route and intercept it on the way back.

At least, that was the plan. I'd have to leave before the message got to Mission Control and the signal was sent back to the rover to send it on its way. I had to hope it would happen.

I looked at my watch. Ashley and Teal were down to less than forty-five minutes of oxygen, and they couldn't possibly reach the soil rover before they ran out. But the little rover was only part of my plan.

"Ashley, Teal, this is Houston. Do you read me?"

There was a delay of a couple of seconds that seemed much longer. "We read you. We think this plan is too risky," Ashley replied.

"If you have a better idea, I'd like to hear it."

They had previously suggested that one of them use the available oxygen and the other simply sacrifice her life. I'd pointed out that there wasn't enough oxygen for even one of them to get this far. They'd both die, just at different times. My solution was the only one possible.

"Look, there's no other option. It's going to work. There's no time to argue. I'll see you soon. Look for me. As we get closer, I'm hoping our personal comm links will work," I said. "This will be my last communication until then. Roger that."

"Copy," Ashley relied. "Copy and good luck...and you don't have to do this."

"Yes, I do. Ground Center, out for now."

I broke off the communications. It was better that I didn't talk. I needed to focus every fiber of my being on making

this work, and they needed to save their breath. Talking took oxygen, and they had none to spare. If this plan did save them, it was going to be by only a matter of minutes. Maybe seconds.

I checked the knots holding the canister in place. They were secure. I had to hope they didn't cause too much sway or movement, as they could create aerodynamic problems. This was going to be difficult enough without any extra complications.

I settled into the seat and placed my hands on the controls. Even if the seat was different, the controls were familiar. I'd run this simulation a dozen times. First on the ISS under the direction of the colonel and then prior to the accident. It was a fun simulation, one I'd enjoyed "playing." It was all so innocent then, because I knew there was no way they were ever going to let me do this on Mars. Now there was no choice. I was going to fly the helicopter.

I looked up at the seven blades above my head. That was many more than on helicopters on Earth, because more blades meant more lift. Mars had much less gravity than Earth, but it also had much thinner atmosphere.

The control in my right hand was for power. The more power, the faster the blades turned, creating more lift. The control in my left hand was a little more complicated. It maneuvered the tilt of the blades to allow me to go forward, backward, left and right. I couldn't help thinking that since most of the world was right-handed, wouldn't it have made more sense to put the complicated control on the right? I'd have to ask Mission Control about that when I got back. If I got back.

I turned the power on, and the blades began turning. I could feel the vibrations throughout my body, and almost instantly I was engulfed by a cloud of red dust. The simulator hadn't prepared me for either of those. I had an urge to power down but instead increased the rotation, which seemed to blow the dust away.

I closed my eyes and ran through the simulator controls. I knew them. I'd had great success in the lab. I'd hardly ever crashed. There was no reason it wouldn't be the same here. Crashing wasn't an option.

Then I thought through the mission one more time. I was going to fly northeast, toward the site and their return route. I was going to drop down in front of them and hand over the two canisters. That amount of oxygen would allow them to continue their route and intercept with the little rover and the two more canisters it was carrying. It all sounded so simple—and it would have been if this were on a simulator in a computer lab instead of on Mars.

There had been previous helicopter flights on the planet. They'd been by a little uncrewed vehicle called *Ingenuity*. It had been able to travel to places that a normal rover on wheels couldn't go. It had been controlled by a pilot on Earth and had provided information that made this crewed helicopter possible. And safe. I hoped. I had to stop thinking and start going. Ready or not, time to go.

I pushed down on the power control and the vibrations and noise intensified, but I wasn't lifting off. I gave it more power, and then I felt myself sway and rise straight up and

off the ground. The dust was left below, but the vibrations continued strong.

I looked down. I was probably no more than fifteen feet above the ground. I gunned the engine even harder, opening the throttle completely and adding at best another few feet of altitude. This was below the level at which the helicopter was engineered to operate, but I had to assume that the added weight of the canisters was the factor in taking away lift. I had to hope it didn't get in the way of forward thrust by creating too much drag. There was only one way to find out.

Carefully I eased the controller in my left hand ever so slightly forward. The machine hesitated, and the seat rocked back and forth, but it slowly began to move forward. I tilted the controller forward more, and I picked up speed. This was working, but I wasn't flying in the right direction.

Still holding the control in the forward position, I twisted my wrist slightly to the left, and the helicopter swerved violently in that direction. I eased off and it steadied, still turning but not so quickly. The tracks of the rover were almost right beneath me. Again I operated the controller, this time more gently, and I followed a path directly above the tracks. Now all I had to do was follow them. From this height there was no danger of losing the trail.

I wished I could have been higher. Height was safety—a mistake could be corrected with a cushion of space between the helicopter and the ground below. Crashing into the ground was the greatest danger now. If the impact didn't kill me, having my Mars suit ripped open or the life-support system

crippled would. Even if neither of those things happened, I might have broken bones or internal damage and bleeding. If the crash happened miles from Ground Center, I would be too far away to walk back, and I'd simply die of exposure or suffocation. There were so many ways to die on this planet.

We'd taken the helicopter out of storage the month before. We had no plan to use it, but we'd had to move it outside so we could retrieve and unload some equipment we needed. If things had gone normally, with no loss of crew members, the helicopter would have been removed and assembled as one of a series of planned tasks. Frank had been scheduled to be the pilot of the helicopter. He'd received extensive training and flown a version on Earth. But without him, all helicopter-related tasks and experiments had been scrubbed.

Still, the machine had fascinated me. I'd spent time on the simulator and had used some of my precious free time on Mars to assemble the helicopter. I'd chosen a spot behind the supply ship, in an area that wasn't on camera, so even Mission Control didn't know what I was doing. It had been fun, and it had felt good to be doing something they didn't know about and weren't controlling. Then, when I'd finished assembling it, I'd reported in and shown them pictures. They were not impressed and had ordered me not to fly it "under any circumstances." I had followed orders, partly because I was more than a little bit afraid to try to fly it.

I'd used tarps to cover it and protect it from the dust. I'd even checked on it and blown away the little that had somehow gotten through the cover. Thank goodness I'd assembled it.

Thank goodness I'd protected it.

In my head I was trying to work through a math problem. It was kind of like the ones in math books: *A train leaves New York for Los Angeles, which is 2,777 miles away, and is traveling 70 miles per hour. At the same time a train leaves Los Angeles, heading to New York, and it is traveling 55 miles an hour. When will the trains meet?*

I'd applied the formula and calculated that they would meet in 22.2 hours at a place that was 1,555 miles from New York and 1,222 miles from Los Angeles. I loved questions like that. I loved algebra and problem solving and always got the correct answers on tests. Even getting that one done in my head had made me happy.

A slight sway of the helicopter brought me back to the problem I was working on now. This was no test. This was real life, and real lives depended on it. I had to focus.

Trying to estimate our intercept point wasn't as straightforward as solving the train problem, because I didn't know all the variables. How fast were they traveling in the rover? The rover had a top speed of six miles an hour, and I had to assume they were traveling flat out. But I didn't know my speed in the helicopter. It was faster than that, but was it more than twice as fast? And what about the distance?

I knew that, as the crow flies, Ground Center and the target site were eighteen miles apart. But the rover wasn't a crow and couldn't fly. They'd had to go around obstacles on the ground, like that ridge, because they couldn't risk rolling over or getting hung up. That had added another three miles

or more, which translated into another thirty minutes of travel time. Unless they decided not to go around the ridge but risk going over it?

If I were driving, I would chance a *possible* rollover to try to avert a *definite* depletion of oxygen. Would they think of it? Would they risk it? And if they *did* go over the ridge, was I following a trail they weren't taking back and would I miss them? I had to factor in how far along it was that they'd encountered the ridge and when they'd hit it on the way back. None of this fit into a simple algebra equation. I wished we were all just on trains. On Earth.

I looked down at my watch. I'd clicked the stopwatch as I left, and it showed I'd been in the air for fifteen minutes. I was traveling at what I estimated was a speed of twelve miles per hour. Distance was equal to rate of speed multiplied by time, so I'd travelled three miles.

They'd been traveling for almost forty-five minutes at 6 miles per hour, so they'd traveled 4.5 miles. Adding the two figures together, we'd covered 7.5 miles, and that left 10.5 miles to go. With both of us moving at those speeds we could cover that distance and intercept in thirty-six minutes...which would mean they would have run out of oxygen six minutes before we met.

I lost my focus for a split second and loosened my grip on the controls, causing the helicopter to swerve dangerously to the side before I regained control.

I ran the numbers once more, positive I was right but hoping I was wrong. They came back the same. There was only

one way this would work. I had to assume they were going to run directly at the ridge. I'd have to go to the spot where their tracks started to move around the ridge and go straight over.

Cutting the route by three miles would mean that we'd intersect ten minutes earlier. That was enough time with four minutes to spare in their oxygen supply. That was four minutes to drop to the ground, unhook the tanks from the helicopter and connect them to their suits. That could be done. That could work. Assuming they'd done the same calculations and were headed for the ridge.

Why hadn't I done these calculations earlier? Why hadn't I told them that was what they had to do? If they died, it was now completely on me. It wasn't a door that wouldn't close or suits that weren't fully charged but me unable to do a simple algebra formula soon enough. Their deaths would be my fault.

Seventeen

I saw the curve in the tracks before I could detect the height of the ridge. The ridge looked more like a shadow than an obstacle. Closing in, I could see it more clearly. It wasn't high, but it could be potentially dangerous to the rover. Not as dangerous as running out of oxygen was for the passengers. I went straight over.

I took a quick glance at my watch. They had less than eleven minutes of oxygen left, and if I was right, I'd meet them in less than seven minutes. That is, if they also had chosen to go over the ridge. And if they chose the same route over as I did. And if the oxygen gauges were correct, and if they weren't using up oxygen more quickly because they were panicking and if they hadn't already run out of oxygen and it was too late.

If I only had more elevation, I could see farther ahead. Thank goodness the land was relatively flat. It wasn't like I'd pass by one side of a ridge with them on the other side and we wouldn't see each other. I could see into the distance, but

I couldn't see them. How much farther should I go straight before I veered off to the left, to where they would be if they were simply following their tracks back? Either I'd find them soon or I wouldn't find them at all. At least, not alive.

I pictured touching down beside a rover that was no longer moving. Unstrapping myself and rushing over, opening the door that wouldn't close, finding the two of them, slumped over, dead. What would I do then? How could I go on?

What would those last few minutes have been like for them as they burned through their final breaths of oxygen? They would have been aware of what was happening—at least, until the very end. On a physical level, as the oxygen level decreased they would have felt less sharp, then confused and almost numb before losing consciousness. I'd read that it would have felt like they were just going to sleep. At least it wouldn't have been painful.

Out of the corner of my eye I caught sight of a little cloud of dust. Eddies and dust devils were always forming. It was far away but already rising higher in the sky. The last thing I needed was to be caught in one of those. It could foul the engine or gears and bring me down. Maybe that would be better if Ashley and Teal were gone. Did I want to live without them? *Could* I live without them? Whether it was here on the ground or trying to launch or on the way back, I couldn't do it all myself.

Wait...there was one other thing that could make a dust cloud. If they had decided to go around the ridge, they'd be somewhere in that direction. I veered violently to the left,

causing the copter and me to sway and swing before settling in. I pressed forward, aiming directly for the dust cloud. If it was them, they were still moving and they were still alive. And then I noticed that the cloud was moving in a straight line. Dust devils twisted and turned. It had to be them.

I strained my eyes, trying to look into the distance and through the dust, and I saw the rover! At least, I thought it was them. Were my eyes playing tricks on my mind? No, the sunlight caught the white roof and the windows and bounced up at me. It was them!

They were still alive, but for how much longer? Had I done the math correctly, or was there a built-in cushion in the system that underestimated the available oxygen and life by 10 percent? That would still have them breathing for another few minutes. Or maybe they'd managed to get the door closed or figured out how to have the scrubber feed some air directly into their suits. Or there was one other possibility. Only one of them was alive.

My mind was flooded with that thought. Had they decided not to listen to me, and sacrificed one of their lives on the chance the other could live? What if I came down and only one was alive? Would it be Ashley or Teal? I couldn't bear to even think about that. I would have given up my life willingly for either of them, but I couldn't bear the thought of one of them being dead. It didn't matter which. I loved them both more than anybody else in the universe. They were more than my mission mates, more than my friends, more than family. They were everything in my world, even if that world wasn't Mars.

I was closing in, but they didn't know I was here. They were looking for me in front of them and I was now behind them. Instead of coming toward them, I was chasing them and they didn't know it. They were running away from me at six miles per hour and I was chasing them at double that speed. The two trains were now running in the same direction.

If only I could let them know—maybe I could. If we were close enough, there was a way.

“Rover, this is Houston, do you read me?”

There was dead air. Nothing. No response.

“Rover, this is—”

“Who did you say it was?” Teal asked. “We don't talk to strangers.”

I almost burst into tears. “You have to stop or turn around. I'm behind you!”

“Copy that,” Teal said.

I watched as the cloud of dust moved to one side. It was making a turn. And as they started back toward me, I could clearly see the rover.

“We see you! We see you!” Ashley screamed.

“Roger that. Could you please stop screaming, save your breath and get ready to leave the rover and receive the tanks?”

“Copy that, Houston. We no longer have a problem because you are here to save us!” Teal replied.

The rover continued to roll toward me, and I flew toward them. They came to a stop, and the cloud of dust they were making continued on. I swerved and came in, slowing down as I altered the angle of the rotors. Almost there. I was only a

few seconds from being directly above them, and as I looked down the unsealed door popped open completely. First one and then the other climbed out. They were jumping up and down and waving.

I looked away. I couldn't look at them. I had to focus. Landing was dangerous. I couldn't let the last few minutes of our mission be the last few minutes of our lives. My right finger seemed to be jammed on the control, keeping the throttle fully open. Slowly I eased off my grip and started down. I looked through my feet as the ground rushed up to meet me, through dust that eventually engulfed me. I released my grip completely and the engine cut and the blades slowed down and started to drift to a stop.

Instantly Ashley and Teal were at my side as I took off my belt and struggled to get to my feet. I released the snap on the tie-down belt to free the two canisters of oxygen.

"Ashley first," I said.

Without seeing her face, I saw that Teal straightened up in surprise or shock.

I fished a tool out of the chest pocket of my Mars suit. Then, spinning Ashley around, I worked to release her now almost completely expended tank.

"Hold your breath," I said.

I released the tank and grabbed the replacement. I hefted it up and fumbled around, trying to make the connection.

"Let me hold it," Teal said.

She took the tank and I worked the tool to make the connection. It opened the valve.

“Breathe! Let me know if you can breathe!”

She let out a deep sigh, and it felt like I could hear her inhale. “It smells sweet...fresh.”

“Great. Now Teal. Turn around.”

Once again using the tool, I removed her tank, and Ashley lifted up the replacement. This time it went more smoothly. I turned it on.

“Ahhh, that is amazing. Houston, you did it.”

“We’re not safe yet. We’re only partway there. You have to drive to the little rover to get the next tanks. Here, take the tool.”

“Are you sure it’s going to be there?”

“It should be, but it doesn’t matter. I’m going to go back to the Ground Center and get two more tanks and meet you there.”

“Redundancy,” Ashley said. “Always build in redundancy.”

“Better twice as many *as* needed than not enough *if* needed. Please, both of you get going.” Then I thought of something. “It was important to get Ashley hooked up first.”

“I understand why you did it,” Teal said. “It’s always best to save the last person you kissed.”

I was stunned.

“Don’t look so shocked. What else do you think dying people are going to talk about?”

“I did it because she’s the one who knows how to pilot the rover. She needs to be conscious to get you both back home! That was the reason.”

Both girls laughed. “I told you he’d react that way,” Teal said.

“Almost worth getting saved for, all by itself. We’ll see you at the next intersection point,” Ashley added. “Let’s go.”

Eighteen

“Time to get up, sleepyhead. Merry Christmas!” Teal exclaimed.

“Merry Christmas to you too!” I replied as I climbed out of bed.

She threw her arms around me and we hugged.

“My turn!” Ashley said, and we hugged too.

“Are you going to give us both a Christmas kiss?” Teal asked.

“This is getting old.”

“I don’t know. I think it’s funny. Ashley?”

“Still makes me laugh, so not that old.”

It had been over a month since the rescue. A month since that joke was born.

“I know what I’d like as a Christmas present,” I said.

“To kiss us both?” Teal asked. “We could do it as sort of a blind test and—”

“For you two to retire that joke.”

They looked at each other. “Well...he did save our lives,” Ashley said.

“Fair is fair. But I did get you something else, so I hope you’ll accept a second present as well,” Teal said.

We’d have to climb down from the sleeping quarters to the galley. For the last few nights we’d slept in *Horizon*. We generally spent two-thirds of our time in our home in the supply ship. We’d opened up three sections so we could sleep, eat, work and exercise over there. Despite the extra space, we still most often shared the same sleeping space. Being in my own little room on *Horizon* seemed odd. Ever since the helicopter rescue, and my worrying about losing Ashley and Teal, I didn’t like letting them out of my sight.

The incident had also changed the orders we were receiving from Mission Control. They’d realized that no matter how well we were doing, we were still only teenagers. They couldn’t expect us to do things that were too difficult or dangerous. The most important experiment we were doing was seeing if we could stay alive.

The world had heard about the rover going to a remote site to drill for soil samples. They also knew about my helicopter ride to bring them “supplies.” I’d been told the images of me flying the helicopter had become a popular desktop icon and a poster. I only knew about the poster because my aunt Suzie had told me about it, and how it was on the back of the Boo-Boos’ bedroom door. That would have been even cooler if she hadn’t told me they sometimes threw their dirty socks at it.

There was also a rock group that wanted to use the image for the cover of an upcoming album called *Flying High*. The International Space Agency hadn’t granted them permission

because the album title was also the title song and was about getting drunk on a plane.

What they hadn't told the world so far was how close the girls had come to dying. When we'd run a test of the tanks two days after the incident, the levels were so low the regulators didn't register them having any oxygen at all. Ashley and Teal had been running on fumes. If I'd been even two minutes later, they would have been unconscious. Five minutes later they would have been dead or so brain damaged from oxygen deprivation that they both would have been in nothing more than a vegetative state. That would not have made a good poster or desktop image.

"I've made a very special breakfast," Ashley said.

"And we're looking forward to it, but let's open the presents first," Teal replied.

We left our sleeping quarters and entered into the area we'd set up as a galley. At the side of the section was our Christmas "tree." It stood almost twelve feet tall but was still dwarfed by the thirty-foot ceiling. It was made of metal pieces of different lengths that had been connected to resemble a pine tree. We'd decorated it with a combination of clothing, empty meal bags, digital instruments, handmade ornaments and pieces of pipe and bolts strung together with wire to form a gigantic garland.

There were paper stars with pictures we'd printed out of our family members and our "family" at Mission Control, including five special stars to remember our fallen crew members. I liked having the colonel, Yuri, Frank, Colonel Kim and Commander Ingram looking down on us. We'd even

managed to find a rare picture of Commander Ingram smiling. I thought they would have liked the tree.

At the very top, as our star, was a shiny metal bedpan. It was upside down. I'd thrown it up and it had caught on the point, rattled around and then settled in place. It somehow seemed fitting because this was the most unique Christmas imaginable. It was the first Christmas on a new planet. I liked to think that in the future this was what Christmas trees would look like on Mars. Someday there would be hundreds of homes with hundreds of trees, all topped by a bedpan.

We'd shared the pictures of our tree with Mission Control, who had shared them with the press, who had shared them with the world. Apparently we'd started a trend, and there were tribute trees in different places around the planet.

With a day on Mars being thirty-nine minutes longer than on Earth, we were often out of sync with the planet. Today was one of those days. As we started our celebration, Christmas was almost over on Earth. We had—at the request of Mission Control—pre-recorded Christmas greetings that had been broadcast around the world. They'd been very well received. The messages had been delivered in eleven different languages. Ashley had done Russian, Mandarin and Cantonese naturally. She had also worked on an Arabic version. Teal had spoken in French and Spanish, since she was fluent in both, and then Italian and Portuguese, which had some similar sounds.

My contribution was to learn phonetically how to give a brief greeting in Korean—in honor of Colonel Kim—and in

Hindi and Swahili. I was told I did all right and that I even had a “pretty good” Swahili accent.

We had received Christmas greetings from our families and from political leaders around the world. We were even mentioned in the Pope’s Christmas Eve blessing from the Vatican. Teal had kindly translated what he had said. He’d made some joke about how he wondered if we could see the Christmas Star more clearly from Mars.

We’d all been looking forward to Christmas for weeks. It was good to have something to look forward to when each day seemed like it was from *Groundhog Day*. We went through the same routines, did the same things, ate the same foods and had a lot of the same conversations. Here we were on Mars, and life had settled into a boring rut. But that was better than the terror of the rescue. Boring had its benefits.

Under the tree were six presents. One present each from the other two. We’d realized it wasn’t like we could go out shopping, so we had agreed to limit the number of presents. There was no limit on cost, because every single thing that started on Earth and ended up here was worth a fortune. It had been estimated that to move one pound of material from Earth into orbit cost around \$10,000, so to get it to Mars cost probably ten times as much. That meant anything in those packages was worth a minimum of \$50,000. It was like giving somebody a car. Not that a car would have any value up here.

“I want you to start by opening the presents I got for the two of you,” Teal said.

She reached under the tree and removed two packages. They were bulky and were wrapped in remnants of the material we'd used for the solar panels and held together with aluminum tape.

"Not only is this a great wrapping job, but it could generate energy," she said as she handed them to us.

"You first," I said to Ashley.

She worked her way through the thick tape until she could slip the present out through the open end. It was a flight suit.

"Um...thanks," Ashley said. "At least I have a place to wear it."

"Look closer. On the sleeve."

She turned it over. There was something embroidered on the arm.

"Thank you so much!" Ashley said as she threw her arms around Teal.

"What does it say?" I asked.

Ashley turned it toward me. "Ashley Ling—Captain, Astronaut, 1st Person on Mars, Best Friend and Sister," she read aloud.

She and Teal hugged again. I had a pretty good idea now what mine was going to be.

"I didn't know you could embroider," Ashley said.

"Sewing, embroidery, knitting. I am basically a grandmother in waiting. Open yours, Houston."

I peeled away the tape and followed Ashley's lead, slipping the contents out of the end.

“A flight suit—wait.” I took a closer look at the sleeve. “Houston Williams, Commander, Pilot, Rocket Boy, Hero, Friend and Family.” I turned to her. “Thank you.”

“There’s more,” Teal said. “Look under the sleeve.”

I turned it over. “Kissy-Face Boy?”

She and Ashley burst into laughter. “I did that before I promised not to kid you. You can just keep your arms down and nobody will notice, or I can pull those last words out if you want.”

“I’ll keep it just the way it is.”

“Seems appropriate since you are the only person in history to kiss everybody on an entire planet,” Ashley said.

“That joke never gets old,” I said.

“Now open the presents from me next,” Ashley said.

Ashley reached under the tree and got out two packages. The one she handed to me was larger than the one she passed to Teal. They were wrapped in pieces that had been cut from storage bags.

“Me first,” Teal said.

She opened up the bag and removed the contents. There was one more layer to peel away.

“It’s...it’s me.”

I looked over Teal’s shoulder. It was a painting of Teal!

“I hope you like it,” Ashley said.

“I love it!”

“I don’t think I really captured you, but I tried.”

“You did a great job. It looks just like her,” I said.

Teal was pictured in her Mars suit, helmet off, sitting on

the tire of the Mars rover. Ashley had captured not just the scene but the expression on Teal's face.

"You've really gotten good," I said.

"I used to like painting when I was young, but there wasn't time for it. My guardians wanted me to focus on math and science courses."

She had gotten the paint and supplies from Colonel Kim's quarters. Dr. Kim was known in Korea not just as an astronaut but also as an artist, and she had included art supplies in her personal effects. She had planned to paint while on Mars.

"She and I talked about her painting. I didn't think she would mind my using her paints," Ashley said.

"She would have been honored," I replied.

"And I'm sure she would have been happy," Teal said. "Houston, your turn."

"Oh yeah." I'd temporarily lost track of the present in my hands.

I undid the tie sealing the package and pulled it out. I unwrapped the last layer and turned it over, expecting to see a portrait of me. It wasn't.

"It's beautiful."

"I hoped you'd like it," Ashley said.

"No. I love it."

It was a painting of the Martian landscape.

"I thought by giving you two the first portrait and the first landscape painting, both would be equally special and valuable. After the *Mona Lisa*, these might be the two most valuable paintings in the universe."

My painting was at sunset. There were shades of purple as the blue sun set behind reddish volcanoes. It was realistic and beautiful.

“I took a picture and painted from that. The same thing I did with Teal’s portrait. Do you recognize the scene?”

“Of course.”

“But do you *recognize* it.”

“It’s just west of here.” Then I realized exactly where it was and why she’d painted it. This was the spot where we’d sat in the Mars rover and stared out at the setting sun, and where we’d kissed. Our one and only kiss.

“Thank you,” I said. “It’s very special.”

I had the feeling this was a secret between the two of us, and Teal didn’t know.

“I’ll treasure it always.”

“You better,” she said.

“Okay, time for you to open the presents from me.”

I grabbed the two little packages and passed them to the two of them.

“Good things come in small packages,” Teal said.

“It’s going to be hard to compete with your presents,” I replied. “Both of you open them at once.”

They slipped them out of the storage bags.

“Christmas paper!” Ashley exclaimed.

“Where did you get Christmas paper?” Teal questioned.

“Target had a special...last year. I had my aunt send up the paper in the last shipment we received from Earth after we’d been selected for the Mars mission. Open them.”

Both packages were sealed with regular cellophane tape. It wasn't just the wrapping that had been sent up from Earth but what was inside. At my request, my aunt had wrapped them.

"The paper is so pretty," Ashley said as she carefully tried to undo the tape.

"Just rip it!" Teal said.

They undid the paper. Two identical little cardboard boxes.

"Go ahead, open them."

They opened the boxes to reveal identical gold chains, each with a small diamond chip.

"It's beautiful!" Ashley exclaimed.

"I love it!" Teal added.

"I bought them with money I earned helping my uncle with landscaping. I know the diamond is just a chip, and it's nothing like the one you have, Teal."

"It's better than that one!" she said. "It's the most precious thing anybody has ever given to me."

"She's right. Put mine on."

They took turns helping each other put the necklaces on.

"I'm never going to take it off," Ashley said.

"Me neither."

They both hugged me.

"This is the best Christmas I can remember," Teal said. "There's no place I'd rather be."

I thought back to my previous Christmas, and then the one before that and the one before that, and then to the last Christmas I'd spent with my mother and father. And the Christmases before that. The celebrations, the family gatherings

that included my aunt and uncle. The good times. The presents. Teal was right. This was the best Christmas I could remember.

There was a loud beeping sound. It signified an urgent incoming message.

“I’ve got it,” Teal said.

She went to the comm-link panel.

“Urgent message from Mission Control,” it began.

“I bet it’s about the weather system,” Ashley said.

Teal clicked on the message. “The storm has intensified and has suddenly shifted direction,” the message continued. “It is expected that the leading edge of the storm will reach Ground Center at 10:30 SMT.”

That was less than twelve hours from now in Standard Martian Time.

“It is predicted it will be classified as category one on the SSHW scale.”

SSHW was short for the Saffir-Simpson Hurricane Wind Scale. A category-one storm would have sustained wind speeds of between seventy-four and ninety-five miles per hour.

“Attached is a list of remedial actions and safety recommendations to be executed before the storm. Please do them immediately and then take secure shelter.”

“I guess this really makes it Christmas,” I said.

“What do you mean?” Ashley asked.

“I’m from Wisconsin. It’s never Christmas without a storm. Let’s get to work.”

Nineteen

I had to fight against the wind to move. We still had more than an hour until the leading edge reached us, but it was obvious just how strong this storm was going to be. The air was filled with dust. Visibility was so limited that *Horizon* had disappeared into the haze.

I'd never been through a hurricane. Neither had Ashley. Teal had told us stories about being with her mother, when Teal was seven or eight, on a photo shoot in the Caribbean. They were on a tiny island when a category-four storm hit. It had practically destroyed the entire island and had peeled back the roof of the place where they'd taken shelter. She had said it was the most scared she'd been in her life. Now she didn't seem scared at all. She was calm and professional, and that rubbed off and had an effect on Ashley and me.

"I've brought in the little rover," Ashley said.

One of the orders was to take in the soil-sample rover. It had been brought in through the air lock and was going to sit

the storm out safely sheltered in the supply ship. It felt like bringing the family dog in out of the rain. We all had an affection for the little guy, especially after he'd brought the oxygen tanks out to help save the girls. It was sort of like Lassie saving Timmy after he fell in the well.

Ideally the weather station would have been protected as well, but Mission Control wanted it to be out there to record the full impact of the storm. I just hoped it would survive. It had continued to give readings to both us and Mission Control. Some of the information was so technical that we couldn't read or interpret it. We'd been relayed an update about the storm just before we went out, indicating that the winds were continuing to gain in strength—the storm could become a category two, but in any case there would be wind gusts ranging around a hundred miles per hour—and that the front of the storm was almost a thousand miles wide and almost as deep. When it hit, it was going to hit us hard and long. It might be ten hours from right now before the winds finally faded.

“How are you coming with the communications array?” Ashley asked.

“I've taken down the antenna, and Teal brought it inside. I'm going to be covering the other parts and lashing it down.”

With the antenna down, we were no longer in contact with Mission Control. There would be no communication. Even the satellite that sat above us in geostationary orbit would be blinded by the storm. Mission Control wouldn't be able to hear us, send us messages or even see us. We'd be completely isolated.

“Do you need help with the Mars rover?” I asked Ashley.

“Just finishing, but it wouldn’t hurt to have a second look.”

“Copy that. I’ll be there as soon as I’m finished here.”

I had to be extra careful with the communications system. We had a backup system, but once we were using it, there was no further backup. We needed to stay in contact with Mission Control for day-to-day instructions and information, and even more for when we were going to launch. It would be almost impossible to do that without their reports, data and information.

I finished tying down the last section and then went back over everything, double-checking. Finally I dropped to my knees and checked the supports holding it in place. I gave them a big shake with my gloved hands. They were solid. The communications array wasn’t going anywhere.

I looked up and felt disoriented. The dust was getting thicker by the moment. It wasn’t just *Horizon* that was lost from view. The walls of the greenhouse were becoming blurry, more fiction than fact. The rover and the helicopter were in a little nook that was protected by the ship on one side and the passage on a second and was partially blocked by the greenhouse itself. I walked toward it, pushed along by the winds.

I saw the flashing light on Ashley’s Mars suit before I could see anything else. All the suits had these emergency lights, and we’d activated them. In addition we were connected by the comm link and were being tracked by GPS. We’d also made a point—I’d given an order—that nobody was to go more than a few dozen feet away from the walls of the

greenhouse structure. If somehow they got disoriented, they were simply to radio in, sit down and wait for somebody to come and get them. We couldn't risk getting lost out there. It would mean death.

I came up beside Ashley. She was using ropes and chains to tie the rover down to the holds on the side of the ship.

"I wish we could bring it inside as well," I said.

"It's pretty heavy and well secured. At least I think it is."

"I'll check." I bent down, tugged on the ropes and then climbed under the belly of the rover to continue my check. It certainly did seem to be solidly anchored to both the ship and the ground.

The rover was important for the remainder of our mission. It was not just to carry out experiments but to transport food and fuel from the supply ships back to *Horizon*. Without its towing and carrying capacity, we'd have to do all of that by hand. The rover had been, aside from the time it almost killed the girls, completely reliable. Even then it was a minor thing that had caused the problem. A small aluminum screw that held the door in place had come partially unscrewed. Those few millimeters, not enough to even be noticed, had stopped the door from completely closing and the seal being established. Ashley and Teal had almost died because of a screw coming slightly out because of the vibrations of the vehicle.

This was the thing about being in space. There was so little margin for error. Every single thing, literally hundreds of thousands of them, had to go right for us to live. Even one thing going wrong could lead to death.

“It looks good,” I said.

“All that remains is the helicopter,” Ashley said. “It’s a shame you were ordered not to take it up again after the rescue.”

“They figured the risk was too great, but you know, right now, with communications out and the satellite blinded, this may be my last chance to fly it.”

“What?”

“I could take it up, have a look around, maybe fly it to safety.”

“What! You can’t do that! You could...oh...you’re kidding me, right?”

“Yeah. Taking it up in these winds, it would crash to the ground almost immediately. The problem is, things that are aerodynamic and made to fly are more likely to fly when a big wind comes along. I’m afraid the helicopter could be picked up and smashed against the greenhouse.”

“There’s no way to take it inside, is there?” she asked.

“Too big, especially with the width of the blades, and there’s not enough time to take them off. We’ll lash it down the best we can and then cover it up. We’ll have to hope it survives.”

A smattering of gravel and larger pebbles noisily pummeled my face shield and my body. I couldn’t help turning away. I could feel them through the suit.

“After securing the chopper, what’s left on the list Mission Control sent us to do?” Ashley asked.

“This is it. At least for tasks on the outside. There are things to get ready on the inside. We’ll go in soon, and I can look at my beautiful picture.”

“You really like it?”

“How could I not? It’s a special picture.”

“Because of the picture or the place or something else that happened there?” she asked.

“Because of all three. I didn’t need the picture to remind me, but now, for the rest of my life, every time I look at that picture I’ll be reminded of—”

“You two know this isn’t a private comm link, right?” Teal piped up.

“Sorry. Forgot. Not trying to get you jealous,” I replied.

“I’m not jealous. Maybe a little bit left out. You two need to get back in. It’s starting to feel a little eerie in here.”

“How come?” I asked.

“We’ve had some flickering lights, and I’m not positive, but I think the ship is rocking a little. Come on in.”

“Roger that. We’ll be in shortly,” I answered.



We were staying in the aft section of the supply ship. I was sitting and reading, Teal was writing in her journal, and Ashley was painting.

We’d sealed the air locks to the other two sections we had been using. We didn’t want a breach in one section to affect the others. We’d worked to stock the aft section with extra Mars suits—fully charged—two dozen oxygen canisters and enough food to last one month. It was redundancy, followed by double redundancy, followed by a healthy dose of paranoia-fueled preparation. Teal had given me a bit of a hassle when I insisted

on doubling everything that had been recommended by Mission Control. I reminded her how much better things would have been if they'd taken four oxygen canisters instead of two on the mission where they almost died. She had shut up, saluted me and got back to work.

I'd also insisted that we all wear our Mars suits, with just the helmet and gloves removed. Nobody objected until I insisted that we needed to practice putting them on quickly in case we had a breach in this section. Both gave me a hard time until we made it into a little race. Ashley was clearly the winner of that contest.

"Did you feel that?" Ashley asked.

"I did," Teal replied. "It felt like the whole ship shimmied a bit."

We'd been safely locked away inside for almost four hours. If the estimates were right, we were almost halfway through the storm and were most likely feeling the strongest winds right now.

"How do you think *Horizon* is doing?" Teal asked.

"I'm sure it's fine. Its specifications are to be able to handle wind speeds 50 percent higher than what we're experiencing," I said reassuringly. "It'll be standing when the storm clears."

"And if it isn't?" Ashley asked.

"Then we settle in for a much longer wait while they send a rescue ship to get us. Look, it's going to be fine."

"If you're so confident, why did you suggest we stay here instead of there?" Teal asked.

“There’s nothing we could do there but wait. Here we might be able to do something to save some of our infrastructure if we had to.”

“How do you think we’re doing?” Ashley asked.

The thickness of the dust had left us blind, blotting out the view from the cameras and through the portholes of the ship. With the communications array down, we were still out of radio communication with Mission Control, and the satellite couldn’t see and wouldn’t have been able to report even if it could.

“The pressure indicator is still good. The greenhouse and the tunnel are still intact.”

“What about the rover and communications link and the helicopter?” Teal asked.

“I wouldn’t be surprised if the helicopter made its first unmanned flight on Mars, but the other two are pretty solidly anchored down.”

“And if they’re not?”

“Then we don’t have a rover. We go to the backup communications grid, and we go on. There’s nothing, including the greenhouse, that’s essential for our survival,” I said. “You know all of that.”

“Yeah, I do,” Teal said. “I just want this to—”

There was a massive crash, and we all jumped. It felt like an earthquake—a Mars quake.

“Put on your helmets,” I said.

“What do you think that was?” Teal questioned.

“It was an order. Put on your helmet!”

We all grabbed our helmets and snapped them into place.

“One of the ships must have toppled over,” Ashley said.

“Do you think it could have been *Horizon*?”

“It felt too close,” I said. “It had to be one of the supply ships.”

“Thank goodness it wasn’t *Horizon*,” Ashley replied.

“That doesn’t mean *Horizon* hasn’t fallen as well,” Teal said. “All we know is that winds have been strong enough to cause ships to topple over.”

“We need to let Mission Control know that—” She stopped herself.

“We’ll let them know once the storm passes. Once we know what happened. Once we’ve put the communications array back up,” I said.

“And until then?” Teal asked.

“We wait. And hope.”

“With our helmets on?”

“We’ll take them off. Soon. I just want to check the other sections of this ship to make sure we haven’t been breached.”



The breathable atmosphere had been removed from the air lock. We were waiting for the Mars atmosphere to fill it so its pressure was the same as outside. The little window at the end of the air lock was as useless as the portholes on the supply ship. Red dust had covered up all the windows. I had to hope it was just a film and not a seven-foot pile of dust. That would be one heavy drift to dig out of to exit the lock. I was anxious to get outside and see what damage had been done.

The storm had lingered a lot longer than predicted. By the time it was calm enough for us to go out to check, it was too dark to bother. Mission Control wasn't expecting a message until morning, but I knew they'd be worried. I wished we could let them know sooner that we were okay.

Before the sun had even come up, we'd already done an internal investigation. The greenhouse and the passage had remained intact, and the atmosphere had held. The supply ship we were using as our home still had integrity in all sections. Whatever had fallen probably hadn't fallen onto us, and if it had, the hull hadn't been breached by the impact. It had to be one of the other supply ships that had toppled over. It really didn't matter.

What would we find out there? We ranked things in order of increasing importance. The helicopter was gone or destroyed. We'd lost the rover. The parts of the communications array we'd left out had been broken or blown away. Worst of all, *Horizon* was lying on its side and the hull was ruptured. I could picture that clearly in my mind, but I tried not to.

The lights on the air lock turned green.

"Okay, we can go," Ashley said.

I depressed the buttons and turned the crank, and the door opened slightly. As I pulled it open, a pile of red dust fell into the air lock.

"It's a dust drift," I said.

I stepped through the pile, which was two feet high. Stepping out, I was amazed. Dust drifts extended three or four feet up the sides of the air lock, the greenhouse and the ship.

"*Horizon* is there," Ashley said.

Horizon was standing as it had been before. I'd hesitated to look because I was afraid of what I might see. The worst hadn't happened.

"Something fell," Ashley said.

I turned toward the supply ships. They were still standing. No—*four* of them were still standing. I couldn't see the fifth.

"A ship is down."

"We're going to investigate, but first things first."

We moved over to the tarp covering the rover. It was covered with dust but undamaged. I passed by the helicopter. It was still there but with a rip in the cover. It might have been compromised by the dust that would have gotten inside. It didn't matter.

Moving over to the communications array, we found the cover still intact.

"It looks good," Ashley said.

"It does."

I undid the clips and removed the cover. The array was shiny and dust-free and looked perfect.

"Teal, can you bring out the antenna sections? I want to get this up and running so we can reestablish communication with Mission Control and let them know we're all right."

"Roger that," she replied.

"While you're getting those pieces, we'll investigate the fallen ship," I said.

Ashley and I moved along, circling around the buildings and toward the ships. It looked like the first and the last ships

to have landed were still standing, so it was one of the middle ones that had fallen.

“It’s number four,” Ashley said. “Number four is missing.”

“What’s on that ship?”

“The rover *was* on that ship. Everything else is mainly duplicates of what’s on every ship. Nothing essential.”

We circled around and skidded to a stop. The ship was lying on the ground. Its tip had come less than forty feet short of hitting against where we had huddled during the storm.

“That was close,” Ashley said.

“Too close. It looks like the hull is intact.”

We walked along the side of the ship. Even on its side, it was still almost forty feet high. I looked along the length of the hull. While it was intact, there were fracture lines. The ship had cracked but not burst open.

“Once we have things up and running, we’ll try to get inside and see what can be salvaged,” I said.

“I can’t stop thinking about what would have happened if it had fallen on our ship.”

“I think we both know. But it didn’t. We’re still here. We’re still alive. Let’s just keep moving forward. A day at a time. Sometimes a minute at a time.”

Twenty

“It looks like it’s working all right,” I said to Teal.

“They told me in the last broadcast the images were fuzzy sometimes.”

“Could that have more to do with the fact that we’re almost 250 million miles from Earth?”

“I just want to make sure it isn’t coming from this end.”

We were going to reach our farthest distance from Earth in just under four days. At that moment we’d be farther away from our home than anybody had ever been. At this distance any radio transmission would take almost twenty-two and a half minutes to travel between the planets.

“It all looks good, but why didn’t you get Ashley to look at it?” I asked. “She’s so much better at these things than me...or anybody within 250 million miles.”

“She has a report to write. Could you stick around while I start the broadcast, just to make sure it keeps working?”

“Sure. It’s not like I have something else to do.”

We had reached a point where we had completed almost every experiment and task that we were capable of doing. Of the tasks we could do, there were some Mission Control just didn't want us to do because they were potentially too risky. Almost losing Teal and Ashley in one of those missions had been a turning point.

There were always tasks we had to do—medical testing, exercise, work in the greenhouse, routine maintenance and things like dusting off the solar panels—but these didn't take the whole day.

It was still too soon to get ready for liftoff. We'd eventually be packing *Horizon*, bringing on fuel and checking every single system on the ship circuit by circuit by circuit. That alone would take weeks, but it had to be done as close to liftoff as possible. There was no point in checking something and then have it stop working a few weeks later.

Teal was filling the time by doing more of her communication videos. She had been asked to do school broadcasts throughout our trip but had been making them much more frequently—every week—for the last two months. She said it helped pass the time, and it made Mission Control happy. The more people saw us and knew us, the more they were in favor of continued Mars missions.

She had been a media superstar before she'd even flown to the space station, and now she was an even bigger one. I'd been featured on one poster, flying the helicopter, but she was on several. That made sense. She was the poster child for this whole mission. Sitting here looking at her, I understood why.

Even if I didn't know her personally, I'd still want a poster of her.

Ashley had thrown herself into painting. She was watching videos, practicing techniques and, amazingly, receiving tutoring from some of the best-known artists in the world. They were helping her to become a better painter. So she was painting a lot. She was so good. I wasn't surprised. Why wouldn't she be amazing at this the way she was with everything she did? She deserved to be on a lot of posters as well.

I filled my time working on the simulator. There were four big tasks ahead. Getting us up off the surface and into orbit. Leaving orbit and aiming for where Earth would be seven months from that date. Bringing us into Earth's orbit. And then, last of all, bringing us down to the surface. I wasn't too worried about that last one because Mission Control had hinted that we'd dock with a shuttle, and that would bring us down. This was a disappointment and a relief all at once. Regardless, I had seven months while we were on route to Earth to practice those last two on the simulator. These days I was focusing on gaining orbit and aiming toward Earth.

"Okay, I'm going to start, so..." She held a finger up to her lips. Like there was any danger of me talking.

"Good afternoon—or morning or evening—and thank you for joining us," Teal said, smiling into the camera.

Her message was being beamed live to Earth and would be viewed by around 100 million students, either directly or in a taped version.

“I’m Teal, and today is February 22, and it’s the 179th Earth day of our mission time on or orbiting Mars.” Of course, we’ve been here for 179 Earth days but, as all of you who follow these lessons know, the day here on Mars is thirty-nine minutes longer than Earth’s. That means we’ve spent fewer days on Mars. I’ll ask my good friend and fellow astronaut Houston to tell us how many days we have actually been on this planet.”

I startled. That explained why she had me here. It had nothing to do with checking out the camera and everything to do with having me as a guest on the show.

“Houston. Come on over,” she said and motioned for me to join her on camera.

I felt like I had no choice. I walked into the camera view and sat down beside her.

“Say hello to your millions and millions of fans,” she said.

I offered a weak little wave and a half smile.

“This is Commander Houston Williams, who is in charge of this mission. Here he is, all showered and *shaved* and spiffy for this interview.”

I heard the way she’d said *shaved*.

I had shaved the day before for the first time in my life. For two weeks Ashley and Teal had kidded me about growing a little “chocolate-milk mustache” and then made fun of me even more when I shaved it off. I knew puberty was a natural process and we all went through it, but was this the time, in front of millions of people, to talk about it? Did she want to talk about hers? We all knew the medical facts, since we’d been

tested so often, and we were all happy that space travel wasn't stopping it from happening.

"Along with being in charge of this mission, Commander Williams also piloted *Horizon* and landed us safely on Mars."

Thank goodness the mustache wasn't where she was going.

"I'm sure you're all aware that Ashley and I were given the honor of being the first people to set foot on this planet. What you probably don't know is that by tradition this was something that Houston, as the pilot and commander, had the right to claim. Instead he gave us that honor. Would you explain your decision, please?"

Great. She wasn't just holding me hostage, she was going to make me perform. For a split second I thought about saying I'd let them go first because I'd thought it might be dangerous, and I'd wanted to risk their lives instead of mine. I thought better of it.

"I believed that since the first person on the moon, Neil Armstrong, was male, it was only right for the first human on Mars to be female. Besides that, Ashley was the first of us selected for the Mars mission."

"Still, I don't know many people who would have given up their shot at history," Teal said. "So, Houston, back to my original question. We've been here on Mars for 179 Earth days. How many sunrises and sunsets have we witnessed on the surface of this planet?"

I started to do the equation in my mind. There were sixty minutes in an hour and—

“And could you please do the math out loud so we can all understand what you’re doing,” she said.

“Okay, there are 60 minutes in an hour and 24 hours in a day, so that means there are 1,440 minutes in an Earth day. We’ve been here for 179 days, so that means we’ve been on the planet for...257 thousand and...and 760 minutes.”

“It’s like he’s swallowed a calculator,” Teal said. “Proving that math is more than just pretty but also practical. Please, continue.”

“Well, a day on Mars has an extra 39 minutes, so its day is 1,479 minutes. Divide 257,760 by 1,479 and you get about 174.”

“So we’ve been on this planet for 174 *Mars* days and nights. Thank you for doing the mathematical magic trick.”

I went to stand up but she grabbed me by the arm. “How about if you stay with us a little bit longer. Maybe you can answer some questions that have been asked, and I have a question for you myself.”

“I’ve really got to get out and—”

“Whatever it is can wait, I’m sure. I’ll even help you once the broadcast is finished. So will you stay a little bit longer?”

She turned and smiled. It was a full 1,000 watt, bright-as-the-sun smile. How did it still make my knees go weak?

“Sure.”

“As always, we’ll be providing an update and answering questions, but we’ll also be sharing some video from our outside cameras and show some shots of the night sky. Ashley will be showing her newest paintings and offering a class. But there’s more. Houston, would you like to know what else there is?”

“Yeah...sure.”

“I’m here to announce, for the very first time, an inter-planetary contest,” Teal said. “All people who enter their names in our contest will be put in a draw to win an original Ashley Ling painting! Isn’t that exciting, Houston?”

“Yeah, it is. She’s very talented.”

“And very exclusive. The winner will become only the third person, after Houston and myself, to own an exclusive, painted-on-Mars Ashley Ling. Of course, you’re going to have to wait to claim your prize until our return to Earth. Which is in how many days, Houston?”

“Three hundred and eighty-two days.”

“Like I said, he is a human calculator. Now this will be our last broadcast for the next two weeks due to the Mars solar conjunction. You’re probably wondering what that means.”

I knew what it meant to me and what she was going to ask. I’d beat her to it.

“Conjunction happens when Mars and Earth are on completely opposite sides of the sun.”

“Please, go on, Houston, and explain why this means there’ll be no broadcast.”

“Radio signals travel in a straight line, but the sun will be in the way of those signals.”

“That all sounds pretty technical. Could you put it in simpler terms? Many people in our audience are in first and second grade.”

I had to think of an example. Then it came to me.

“I want you to imagine that you and your friend are in the schoolyard, and you’re tossing a ball back and forth.”

“That’s easy to picture,” Teal added.

“And this really, really big guy gets in between the two of you. Every time you try to throw the ball to your friend, it hits the big guy instead. You can’t complete a throw.”

“That makes perfect sense!” Teal beamed.

“But that’s just part of it. Imagine that he also has his arms out, and he’s waving them around. You might get a ball past his body, but he could knock it down with his arms. The sun is the big guy, and the ionized gas that the sun throws out is like him waving his arms around. It knocks down the signal.”

“That’s a great explanation! For the next seven to ten days, we’re not going to be able to communicate with Earth because the sun will block our transmissions. Commander Williams, do you think you could join us on our next show after the conjunction?”

I shrugged. “I guess. Maybe.”

“Excellent! And at that time maybe I’ll even have him explain to us how he used algebra to save Ashley’s and my life. He is truly a hero. Fascinating stuff that nobody has heard... yet. Thank you for joining us, Commander Williams.”

Nobody except the people at Mission Control knew about that rescue. Was she really going to tell them? I guessed she was doing what TV shows on Earth did. She was offering a little teaser to keep her audience coming back. We’d soon see what Mission Control had to say about that.

Twenty-One

I let out a groan. I'd tried to stop myself, but I couldn't. It was getting more painful. If I rolled over and turned away from them, they wouldn't hear it. I shifted position, and it felt like a knife was sticking into my side. I let out a sharp cry.

"Houston?" It was Teal. "Are you all right?"

"I'm okay...I just have a bit of a bellyache."

"It sounds like more than that," Ashley added.

Obviously I'd woken them both up.

"It's just gas or indigestion. Go back to sleep, and I'll get up and walk it off."

I threw my legs off the side of the bed, and this time I screamed. The knife had been twisted as well as plunged deeper.

A light came on, and the two of them were instantly at my side.

"Where does it hurt?" Teal asked.

I touched my right side, just where the waistband of my pajamas was. Was the elastic too tight? I had grown a few

inches and put on fifteen pounds, and it wasn't like I could go and get new clothes from Target.

"How long has it been going on?" Teal asked.

"It started last night before we went to bed."

"And you didn't tell us?" Ashley asked.

"It was nothing. Then."

"Well, it's not nothing now. Describe the pain to me," Teal said.

I was going to say something like *Yes, Dr. Teal* but realized she was the closest thing we had to a doctor. Actual doctors were millions of miles away.

"We should communicate with Mission Control," Ashley said. "It's not even night there, and they have doctors on call."

"Look at the time," Teal replied and gestured to the digital clock.

It was three fifteen in the morning and the middle of the period each night when we couldn't communicate because we were facing away from Earth and even the geostationary satellite didn't have a direct sight line to Earth.

"That's partly why I didn't mention anything. I knew you couldn't contact them."

"That doesn't matter," Teal said. "There are things we can do. For a start, do you have a fever?"

"I think a little."

"We'll find out. I also want to do a blood test so I can look at your white-blood-cell count."

"What will that tell you?" I asked.

"If you have an infection, your white-cell count is high."

“And I can get an antibiotic, right?”

“Yes, but we have to figure out the source of the infection. We should probably do a urine test at the same time. Let me check out one more thing. Pull down your pajama bottoms a couple of inches on that side.”

“What?”

“Don’t be stupid. I need to do an examination.”

Reluctantly I rolled down the bottoms.

“Show me exactly where it hurts.”

“It’s changed. It started almost exactly below my belly button and then shifted to the right.”

“Here?” she asked, touching me with her fingers.

I moved her hand slightly over and a little bit down.

She pressed down. “Does that hurt?”

“No, it doesn’t. It almost feels better.” I felt a sense of relief.

“How about this?”

She removed her hand, and I screamed in pain!

“Okay, we need to get you over to *Horizon* so I have more equipment to continue the examination,” Teal said.

I didn’t want to get up. It seemed like way too much work to get dressed, put on my Mars suit and move that far. I just wanted to lie in bed and try to get back to sleep. “Can we wait until—”

“No!” she snapped. “I need to do the tests right away, give you something for the pain and be ready to send results to Mission Control.”

Her serious tone and stern expression didn’t give me any room to argue.

“Ashley, can you please get the Mars suits ready.”

Ashley left. I put a hand against my bed to help myself up. As I struggled to my feet I felt a shot of pain and thought I was going to vomit, and I almost buckled over.

“Are you okay?” Teal asked.

“Not okay. Really not okay.”

She offered me her hand and slowly, with her help, I pulled myself to my feet. This was bad. The only question was how bad.



I was lying on the little table in the examination room. I was wearing two blue medical gowns and was holding an ice pack over the area that hurt. It was dulling the pain. Well, that and the painkillers.

Teal came into the room.

“What do you think?” I asked.

“Your temperature is spiking, and you have a very high white-blood-cell count.”

“So I do have an infection.”

“I think that’s confirmed.”

“The antibiotics will fight it, right? Maybe that’s all I need.”

“We need to know where the infection is. The urine test is being run right now. That will tell us if it’s a urinary tract infection or a kidney stone,” she replied.

“But you don’t think it’s either of those, do you?” I asked.

“We’ll find out soon enough. I also want to give you a CT scan.”

“We were going to disassemble that and take it off the ship before we launch, and leave it here on Mars,” I said.

“Good thing we haven’t taken it apart yet. A CT—which stands for computed tomography—is a series of X-ray images taken from different angles around the body to create a detailed image of your body, including soft tissue.”

“And you know how to do that?” I asked.

“I’ve never done one, but I know how to run it. I’m just not sure how to interpret the results. I’ll send the scans to Mission Control for a doctor to read.”

“What do you think is wrong?”

She shrugged. “I don’t really want to make a guess yet.”

“But if you were to guess?”

“I think it’s your appendix.”

“I’m not really sure what that even is. It’s like an organ, right?”

“More like a small mistake. It’s a little pouch about the size of a finger that extends down from your colon,” she explained. “If it gets infected, it fills up with pus and gets inflamed. That’s where the pain comes from.”

“And what does an appendix even do?”

“They used to think it was useless, almost like a tiny second stomach. Now they think that it stores good bacteria.”

“And why do you think that’s what I have?” I asked.

“You have all the symptoms. Fever, pain in that area, the way you reacted when I touched it and released the pressure. The way it hurts more when you move, and that you wanted to vomit. You’re even the right age to have appendicitis.”

“Are you sure that’s what I have?”

“Of course not. The CT will help make the diagnosis, but that’s my best guess.”

“And if it is that?”

“It’s not an essential thing. You can live without it,” Teal said.

I thought through what this meant. “Does that mean it *could* come out or that it *should* come out?”

Another shrug. “There are two types of appendix attack. One is called chronic, and it comes and goes, and the other is acute. With the chronic one, you can live with it a long time.”

“Over three hundred days?” I asked.

“I don’t know, and I don’t know if that’s the type you have.”

“And if it’s acute?”

“The appendix can rupture, and if it ruptures, the infection can spread everywhere and you can get really sick.” She paused. “You can even die if it isn’t taken out.”

“Taken out? Like surgery?”

“Look, there are probably other things. What do I know? Let’s just finish the test and let Mission Control figure it out, all right?” Teal placed a hand on my shoulder. “It’s going to be all right.”

I nodded. What else could I do? What else could I say?

“It’s all been going so well,” I said.

“It has been.”

“The last ten weeks have been going so easy, it’s almost been boring,” I joked and then cringed as the pain hit again.

“We’ll get through this as well,” Teal said. “Let’s get back to boring.”



“How are you feeling?” Teal asked.

“Like I’m in a really bad dream.”

“Feels a little bit more like a nightmare. Are you comfortable?”

“As comfortable as I can be lying on a metal table, wearing a blue gown and waiting for you to cut into me.”

“I meant the pain. Do you feel any pain?”

“I don’t feel anything. I’m dead from the neck down.” I wiggled my face around. “Maybe from my chin down.”

“Good, that means the drugs are working,” Ashley said.

She and Teal were standing over me, on opposite sides of the table.

“When I turn the drip up, you’ll become unconscious,” she added.

I was vaguely aware of the IV dripping into my arm.

“Can you tell me what’s happening?” Teal asked.

“I’m on an operating table and you’re going to be taking out my appendix.”

“Me and our little robot friend.”

Between the two of them was a robotic arm, hanging above my stomach.

“Hello, little friend,” I said. “I’m going to call you Robbie the Robot.”

They both chuckled. “He’s getting funnier with each drip of medication.”

“I have always been funny. You two are just getting better at realizing it,” I argued.

“Sure, that’s it,” Teal said.

“The medication is making him a bit loopy,” Ashley said.

“Loopy...oopy...and goofy,” I said. “Funny words.”

“And at the other end of your friend Robbie is Dr. McCloud,” Teal continued. “She’s going to initiate the incision and then examine the cut. She’s already given me full instructions on what to do.”

“Because she’s on the other side of the universe.”

“Yes, because she’s on the other side of the universe. We’re waiting for her to start the procedure. But we’re here. I’m going to be doing the removal according to her directions.”

“Teal’s not a doctor, but she plays one on TV,” I said and started snickering. “Isn’t that what they always say in those commercials?”

“I’m the closest thing we have,” she said.

“Teal, do you really think you can do this?”

“Of course I can. I’m confident.”

“Are you just pretending to be confident or are you really? I can never tell with you,” I said.

“I can do it.”

“I’m scared.”

“So am I, but I’m not going to let anything happen to you.”

“You better not. If you kill me, I can’t marry you,” I said.

“Are you proposing?” Teal asked.

“I didn’t know I needed to. I know that someday you’re going to marry me.”

She looked down at me and smiled.

“You and Ashley, both of you. You’ll marry me too, right, Ashley?”

“Of course. You’re the most eligible male on Mars.”

“I meant after Mars. On Earth.”

“Are you going to marry her before or after you marry me?” Teal asked.

“At the same time. Both of you. All of us. We’ll be a couple!”

“Three is one too many for a couple,” Ashley said. “Didn’t you used to be good in math?”

“I was...I am. At the end are you going to stitch me up?”

“Yes,” Teal said. “You know how good I am with a needle and thread.”

“It’s almost time,” Ashley said. “I’m going to turn up the drip.”

“I love you,” I said. “I love you both....my brides. Teal, one more thing.”

“Yes?”

“Instead of sewing me up, could you embroider something?”

She chuckled. “I can try. What do you want?”

“One word...no two...*kissy-face boy*.”

And then the world went black.

Twenty-Two

There was a tap on my shoulder and I looked up. I could see through the bronze face shields of our helmets that it was Ashley. She tapped the side of her helmet. The radio... that was right...I'd turned off my comm link. I turned it back on.

"How are you doing?" she asked.

"Good. No fever today. Third day in a row."

"That is good."

I'd had a high fever for four days after surgery. The incision had gotten infected, and I'd been given another, stronger antibiotic.

"Can I sit down and join you?" she asked.

"Of course."

I shuffled slightly over, and she took a seat on the rock beside me.

"Teal was pretty worried," she said. "I let her know you were out here."

"I guess I should have let you two know. I just wanted to get away and have a little walk."

"It's great that you felt like walking. No pain?"

"Not really. It's a bit tender, but better every day."

"Do you think you could let us know when you're coming outside," she said. "Not permission, just let us know."

"That was wrong," I said. "I'm sorry. I won't let it happen again."

"We got pretty worried when we couldn't raise you on the radio."

"I'm even sorrier. I just wanted quiet, but that was inconsiderate of me," I said.

"Yeah, it was. We expect you to treat your future wives better than that."

"I'm even sorrier about that. I feel, well, embarrassed."

She chuckled. "We all needed the laugh." She looked around. "It's nice out here in a Martian sort of way."

"This is my favorite spot," I said.

"I know. That's why I knew I'd find you here. Teal and I have started to call this Houston's Rock."

I smiled. "I like that."

"Before we go, let me take a picture. I'm going to paint you sitting out here. It'll be sort of a combination portrait and landscape."

"I'd like that a lot. It would remind me of being here. Strange, it's all started to feel unreal even when I'm still sitting here," I said.

"I get it."

“Do you know how many days we have left?”

“Eighty-one days till liftoff,” Ashley said.

“We need all that time for us to prepare *Horizon* and for me to get ready to get us out of here.”

“We know you’ll do it.”

I didn’t answer. I wasn’t feeling that confident or that strong.

“Like you said, you’re feeling better every day. You’ll soon be back to your old self,” she said.

“I know. I just thought that if something had happened to me, what would have happened to you and Teal? Who would have got you back home?”

“We thought about that. We talked about that. We had faith. It’s all we had. Think about it. You had your appendix removed by a fifteen-year-old nondoctor.”

“Her and Robbie the Robot, but I understand. I guess we should get back inside.”

“There’s no rush. Do you want to just sit here for a while?” she asked.

“Yes, I’d like that.”

“Do you want to be alone or have me stay?”

“I’d like it if you stayed,” I replied.

“Me too.”

She reached out and took my hand.

Twenty-Three

I touched my hand against the scar on my abdomen. It would always be there. A little reminder of what had happened and what *could* have happened. It also felt like my own personal rabbit's foot or good-luck charm. If appendicitis hadn't killed me, then nothing was going to. It had been two months to the day since my surgery. I was feeling as strong as ever.

"Coming down!" Teal called out.

We were using a rope and pulley to lower things being removed from the upper level and to bring things on board that we'd need for the trip back. Actually a lot of things were being put on *Horizon* that we hoped we'd never need, like extra supplies and medicines. I guess I'd learned that there was really no way of telling what was going to be needed until the moment that it was.

The big, shiny metal table bumped down on the lowering rope. How appropriate that the operating table was being removed. It was being left in one of the supply ships.

“Recognize it?” Teal yelled down.

“Funny girl.”

“That’s funny *doctor*, please.”

I helped ease it to the ground. It had served me well and deserved to be handled with care. I removed the rope and set the table on its legs.

“It’s off the line!” I yelled back up through the opening.

“Be careful, it’s heavy!” she yelled back down to me.

“It’s Mars gravity, so it isn’t that heavy and I’m fine.”

“Just do what you’re told. You’re still healing.”

The rope slowly disappeared upward for the next load.

We were working in three different spots. Teal’s job was to move items over to the opening in the middle of the ship and lower them down. My job was to disassemble them, if possible, and lug them over to the air lock. Once the air lock was filled with objects, I activated it, withdrawing breathable air and allowing it to pressurize to the Mars atmosphere. Outside, in her Mars suit, Ashley loaded the valuable items on a trailer behind the rover and then transported them to a supply ship to be stored. Other items, if they didn’t serve a purpose, were simply left outside. By dividing up the work this way, there was no need for all three of us to get in and out of our suits or in and out of the air lock.

I checked the legs of the operating table. I’d hoped they could be removed, but they were welded in place. It was one solid unit. And solid was the operative word as I dragged and lifted it along. It had to weigh well over a hundred pounds—on Earth.

Every pound off the ship was a good pound. The less weight we were carrying, the less fuel we'd need to get into orbit. Each item stored was one less thing to be brought here on the next mission or the next. Maybe someday this table would be in the first hospital on Mars. I wondered if I should scratch my initials into the bottom of it, so everybody would know I was the first surgical patient on the planet. I realized that wasn't necessary, because everybody already knew it.

Every single thing we did was a first. And every single thing we did was known by everybody on the planet. There were very few secrets and not much that was private. It was like we were living on some sort of reality show that was beamed live, twenty-four hours a day, seven days a week. Mission Control decided what would be shown and how things would be presented.

The world still didn't know about the near death of Ashley and Teal. After she'd referenced it on her school broadcast, Mission Control had made it clear that she wasn't to talk about it. Eventually, once we were home, that story would come out, but so far it was still a secret.

My appendectomy had become a major news story, but only after we knew I was going to live. For four days it had been kept completely secret. I'd been okay with that. Not that I'd cared what the world would think, but I hadn't wanted my family to know what had happened to me until they could also be told I was okay.

I'd also thought of it from Teal's side of things. How would it feel for her if the surgery didn't go well? The world

would know she had operated on me and killed me. That would have been hard to live with. She would have had to carry that with her for the rest of her life. But luckily she was a hero. The brave fifteen-year-old who had performed surgery on Mars and saved the life of a team member. It did sound impressive, even when I just said it in my head.

Some things couldn't be kept secret though. We'd been growing up before the eyes of the world. I was slightly more than four inches taller and twenty pounds heavier. Ashley and Teal had become, well, much more mature-looking. We were told that young men around the world had crushes on one or both of them. I got it. There was, apparently, all sorts of speculation about whether I was "dating" one or the other. Thank goodness nobody but the three of us knew that I'd suggested marrying both of them when I was being knocked out for surgery.

I muscled the table into the air lock, which was almost filled with objects now. I looked out through the air-lock window and saw that the rover was outside. The door opened and Ashley climbed out. She had been in her Mars suit inside the vehicle. There was no point in pressurizing and depressurizing the rover with each short trip.

"I've put another load of excess items in the air lock," I said. "Ashley, do you copy that?"

"Roger, Houston. How are you doing?"

"I'm good. My incision is good. All of me is good. How's it going out there at your end?"

"I've been lining things up outside the assigned supply ships,

but I'll need help to move them inside and secure them."

"Glad to help. How is your oxygen supply holding up?"

"I'm going to come inside and change suits. Maybe we could stop for lunch."

"That's a plan. I'll seal the door at this end and operate the lock. It'll be good to sit down together."

"Yeah, it will," she said. "Who would have thought that after all this time we're not sick of each other?"

"I think that bodes well for our joint marriage plans."

"Or at least the fact that we're going to go to school together when this is all over."

We were scheduled to arrive on Earth on February 28. After that we were going to be spending extensive time in quarantine, debriefing and then doing a publicity tour. That might take us into June. After a short time apart to be with our families, we were scheduled to start school in the fall. By that time we would have been out of school for two full years. It was going to be strange enough to be in school, to be around all those people, but we'd be doing it together.

We had planned this not just because it would be hard not to see each other every day, but also because it gave us a way to protect ourselves from the world. We already knew we were going to be under constant exposure and pressure. Getting home was just the start of people wanting to talk to us, watch us, want a little part of us. Together we could protect each other.

"After lunch maybe all three of us can go out together," I suggested. "But right now, you should come on in."



"I close my eyes and try to pretend that I'm eating pizza," I said as I shoveled in another spoonful of soup.

"You'd have to close your nose and have your taste buds removed to make that leap," Ashley said.

"Is pizza going to be your first meal?" Teal asked.

"It's going to be my first ten meals. Pizza makes a great breakfast. You?"

"I was thinking something more exotic, like lobster or fresh seafood. Wouldn't it be amazing to sit in a little restaurant on the shore in Italy and eat what they'd caught that morning?"

"I've been to Mars, but I've never been to the Mediterranean," I said. "Although I've flown over it about fourteen hundred times."

"About? What happened to Mathematics Man? Can't you give us an exact number of orbits?"

"Well...at 92 minutes per orbit, and there are 1,440 minutes in a day, and we were on the space station for—"

"I'm kidding. Save that math mind for getting us off this planet. You'll see the Mediterranean in person. You'll be able to travel anywhere in the world you want to go," Teal said. "Ashley, your food choice?"

"Peaches."

"You want a peach?" I asked.

"Plural. I want to eat my *weight* in fresh, ripe, juicy peaches."

I could picture that. I could *taste* that. "You win. We go with peaches first."

“First we get off this planet,” Teal said. “We’re on schedule, right?”

“We’re on schedule,” I said reassuringly. “Within the next three days we’ll be unloaded. The following three days are unloading of supplies onto *Horizon*. That’ll take us to July 5.”

“By then the circuitry checks will almost be completed,” Ashley added. “That should be finished by July 9.”

“And if we need to change circuits or systems?” Teal asked.

“There will still be twenty-one days to do that while I’m working on the simulator, inputting the mathematical formulas they’re sending us for liftoff into the computers, checking the numbers and doing a test fire of the Raptor engines.”

That was going to be a major moment. Had 336 days on the planet caused the engines to become faulty? Would they work? We had six engines. We could get free of Mars’s gravitational pull with only four of them working. Surely four of them would be all right.

“And what if everything isn’t ready to go?” Teal asked. “If the engines don’t work, if we can’t fix vital circuitry, if something else goes wrong, if another storm blows in?”

This was a thought I was sure we’d all had, but nobody had ever spoken it aloud.

“The window for launch is almost thirty days long, so we have a built-in cushion,” I explained.

“And if we can’t fix whatever is wrong in that cushion?”

I shrugged. “I guess we’ll have to wait another 550 days to get those peaches.”

Twenty-Four

I climbed out of the air lock and entered *Horizon*. I'd been outside on my own, taking a break from all the work I'd been doing on the simulator. I'd spent the last hour sitting on Houston's Rock. I found it very peaceful there. It was the closest thing I could imagine to meditation. I'd just sit and stare at the landscape, with the comm link turned off. I always told Ashley and Teal now when I was turning it off. No need to scare them again. They knew now that sometimes I needed not to have a voice by my ear, even if that voice belonged to one of the two most important people in my life.

Today I was thinking about how I had sat there on my rock for as long as I'd wanted to. I could go back out the next day or the day after that or the day after that. But in seventeen days it would be gone. Or, more correctly, we'd be gone.



I removed my helmet and took a deep breath. I felt bone-tired, and when I looked at the stairs I'd have to climb to get to the mess, I wondered, Can I make it? I placed the helmet on the floor, clicked off my gloves and sat down beside my helmet. I'd take a short break before climbing.

It had been a long and successful day. *Horizon* was now fully stocked and ready to go. And we knew it could go. Under the supervision of Mission Control, I'd run a test of the engines earlier in the day. It was a minor burn, less than 5 percent power and only for two seconds, but it demonstrated that all six engines were fully functional. A problem with them was the only thing that could have stood in our way.

It felt like a gigantic weight of worry had been lifted off my shoulders, but now another one had been added. I was responsible for achieving liftoff, obtaining an orbit and then charting our way back to Earth. I'd been working extensively on the simulator, and the results had been promising. Lifting off wasn't nearly as complex or precise as landing had been. Liftoff involved us just sitting there, strapped in, and letting the engines do the work. We'd already fed the numbers into the computer. The final remedies would be minor adjustments and were coming from Mission Control in the next few days.

Communication was much quicker now. As we neared our launch window, the two planets were coming back together. It wouldn't be long until we were only forty million miles apart. At the farthest point away, around the time of

the conjunction of the two planets, it had taken 22.4 minutes for Mission Control to receive a signal from us. Now, as we approached the time of our closest pass, the time had dropped down to less than four minutes. And then, as we traveled and the distance diminished each day, the communication time would become shorter and shorter.

I knew it wasn't just me feeling the pressure. Ashley and Teal had gone through some difficult days checking and then fixing circuitry issues. There had been a need for Ashley, assisted by Teal, to change a number of circuits, but every major system was working now and working well. This didn't necessarily mean that something wouldn't go wrong on the trip home, but we had spare parts for fixing anything that did go wrong.

When she wasn't working, Ashley was in her "studio" painting. Her paintings, along with the soil and rock samples, were the only things we were taking back to Earth from our time on the surface.

Teal, as always, was harder to read. She appeared confident no matter what she was facing or what the situation was or how she was really feeling. She'd told me—long after the surgery and my recovery—that performing that operation was the scariest time of her life. I was grateful to have been knocked out and unaware. She'd saved my life. The way I'd saved her life and Ashley's life, and Ashley had saved our lives. We'd done it together as a team. We'd come a long way from space camp. That was more than two years ago. In some ways it seemed like yesterday, and in others, forever ago.

“Houston, is that you?” Teal called down.

“Were you expecting somebody else I wasn’t aware of?”

I joked.

“We need to talk...you need to hear something.”

Her voice was wrong. It sounded like she’d been crying.

I jumped to my feet and raced up the stairs.



“This is Mission Control, out.”

I turned the recording off. It was the fifth time I’d played it, each time hoping I’d hear something different. Nothing was different.

Ashley and Teal had stopped crying. At least, they’d stopped crying for the moment. I still didn’t believe it. There had to be something I was missing. I went to play it once more, and Teal reached out and stopped me.

“I can’t hear it again. Not right now. What are we going to do?” she asked.

“We need to radio them back. We need further clarification, more explanation or something,” I said.

“Do you really think that’s going to make any difference?” Ashley asked.

She looked ready to burst into tears again. I didn’t think I could hold back my tears if she did.

“I just want clarification,” I said.

“What isn’t clear for you?” Teal asked. “They told us we can’t leave.”

“But maybe there’s something we can do to fix it.”

“Do you really think you can fix the structural integrity of the hull?” Teal demanded.

“Probably not.”

“Probably?” she snapped. She must have realized how she sounded. “I’m sorry. I shouldn’t be taking this out on you.”

“It’s okay. We’re all shocked.”

Mission Control had been remotely monitoring our testing of the ship. The engines had worked well. The problem was the stability of the ship itself. They reported that there were vibrations that could indicate a structural problem with the hull of the ship. That wasn’t surprising—that had been our greatest fear during landing. It didn’t matter if it was liftoff, entry or space travel, if the hull breached, we’d die.

“The important thing is that they prepared for this,” I said. “They built in a backup plan.”

The backup plan they’d been preparing all along, in case something went wrong and we couldn’t leave, was a second ship, unimaginatively called *Horizon II*. It was stocked, fueled, crewed and ready to go. Rather than us leaving Mars in the window when the planets were closest to each other, Mission Control was going to use that window for the second ship to travel to Mars.

The plan was for them to land and leave five people behind, and we’d return with the pilot and co-pilot. Those five people would then be replaced or removed by the ship coming twenty-six months after that.

The message said we’d “done our jobs.” That we’d gotten the world excited about Mars, shown that it was possible, that

the vast majority of people now supported Mars exploration. This should have made us all very happy. Maybe it would after the shock had worn off. After we were finally back home. I guessed that meant we wouldn't be happy for a long, long time.

"What do we do until then?" Teal asked.

"We wait," Ashley said. "We wait another 550 days." She let out a big sigh, and her whole body shuddered.

"At least we're fortunate that we have enough food and supplies to last that long," I said.

"Fortunate? We only have that because five people died. If they hadn't died, we'd be drawing straws to see who would die now," Teal said. "Assuming we're still not going to die."

"We have enough food. I did the calculations," I offered.

"And did you calculate in another massive storm but even stronger, or a meteor striking us, or the breach being so severe it might rupture while we're sleeping, or the communication system going out, or the scrubbers failing? And what about us? How is this going to affect our bodies, being here for another 550 Earth days? Will the radiation we've been exposed to eventually cause cancer or leukemia, or stop us from developing, or turn us into freaks or—"

She burst into tears. Ashley threw her arms around her, and I hugged both of them. Ashley started crying. I wanted to cry too. Not just for us but for my family. How were they going to take this? How unfair was it to make them worry and wait for almost two more years?

I tried not to think about that. Instead I thought through all the things Teal had mentioned. We'd survived one storm, so we should be able to survive another, even a much bigger event. The dangers of a meteor strike were so minuscule, there was no point in even trying to calculate them. The hull might not be able to withstand a launch, but that didn't mean it wasn't still very, very strong. An unforced breach was not a possibility. We had backup communications and backup scrubbers. We had double redundancy for both.

All our medical tests had been good. We'd been protected from radiation. We were developing normally, and we'd regained the bone and muscle loss we'd suffered on the flight. We were healthy. Even unexpected surgery hadn't killed any of us.

I thought about explaining all of that to her right now, but I stopped myself. This wasn't about the head. This was about the heart. And we'd all had our hearts broken.



I woke up in the middle of the night and sat bolt upright. It took a few seconds to orient myself. I was in the sleeping quarters on *Horizon*. The girls were in their rooms just down the hall. They'd moved back into the same room so they could be together. If there had been sufficient space, I think I would have dragged another bed in there too.

I had a thought. It was random, and probably more desperate than real, but it had been there when I'd been trying to get to sleep and now shouted at me to wake up.

I got out of bed and bounced down the corridor. I went to knock on the door but realized the hatch was slightly open, and there was a light on inside the room. Regardless, I tapped on the side of the frame.

“Are you two awake?” I asked.

“Yeah. We were both surprised when you were able to fall asleep so easily,” Teal said.

“Falling asleep and staying asleep are different.”

Should I tell them what I was thinking? I was probably wrong, and it would only make things worse. Unless I was right...and if I was, then our world just got much more complicated. I had no choice.

“What if Mission Control is wrong?” I asked.

“What makes you think they’re wrong?” Ashley asked.

“Maybe wrong isn’t the right word,” I said. “I don’t know if what they told us was wrong as much as I wondered...”

“Wondered what?” Teal asked.

“I wondered if they lied to us.”

Twenty-Five

“I wonder what they’re thinking at Mission Control right now,” Ashley said.

“They’re not thinking anything yet,” I replied. “They just figure we’re all out here doing something we’re supposed to be doing.”

We were in our Mars suits, standing beside the greenhouse. We were visible from cameras at two different angles. If it had just been one camera on us, we would have temporarily disconnected its signal—pretending it was just a glitch or a malfunction—so they couldn’t have seen us. Doing that to two cameras, it would have been obvious that it was done on purpose to blind them. I wondered if anybody was looking closely enough to see that I had a device attached to my helmet.

“They’ll notice soon enough,” Teal said. “I’m going to close down the communications array in a few minutes, before they can ask what’s happening.”

“Good idea. Better to ignore them than defy a direct order.”

“Aren’t you doing that right now?” Teal asked.

“I guess I am as soon as I take the helicopter up. Help me get the cover off.”

All three of us worked to remove the tarp and weights that held it in place. It had accumulated a lot of dust over the past months since I’d been forbidden to fly it.

“Do you think it still works?” Ashley asked.

“We’ll find out soon enough.”

As we pulled the tarp away, we were showered with red dust. The helicopter certainly looked good, and undamaged. The seven blades were all in place, and the controls looked clean and dust-free. None of that meant it would fly. It had been months since the rescue, months since I’d been ordered not to fly it anymore. One more flight was going to happen whether they wanted it to or not. It wasn’t going to go far away, but it *was* going to go up.

I settled into the seat and did up the straps. “You two have to get back. Far back.”

“Are you sure this is a good idea?” Ashley asked.

“If anybody has a better one, I’m willing to listen. We have to try. If it proves that they’re right, we have no choice. We can’t just give up without a fight,” I answered. “And Teal, how are you with broken bones?”

“Compared to surgery, they’re a piece of cake.”

The two of them bounded away and took shelter behind the little rover. Ashley had brought out a computer—she was going to be receiving the signals I’d be sending.

I clicked on a button and the lights of the helicopter came on. It had power, and the circuitry was still functioning. I pushed the ignition button, and the blades slowly started to turn. Dust shot away in a little circle of clouds.

I reached up and turned on the scanner that was attached to my helmet. In flight I wouldn't be able to do that, as I needed both hands free to fly.

"Are you getting readings?" I asked, looking over to where the girls were crouched.

Ashley gave me a thumbs-up. It was now time for me to lift off.

I pushed down on the controller and soared straight up. Almost instantly I was fifty feet in the air. Obviously I could go higher when I wasn't carting around two heavy oxygen canisters like I had been on the rescue mission. The question still to be answered was, How much higher?

I pushed the left-hand controller forward, and the helicopter instantly reacted, taking me away and across the opening and straight toward *Horizon*. In a few minutes Mission Control would see images of me flying. They'd see me disobeying the order not to use the helicopter, but how long would it be before somebody figured out exactly what I was using the helicopter for?

I slowed down as I approached *Horizon*. I wanted to circle around it, not run into it.

"Are you still receiving the signal?" I asked.

"Strong and clear. Recording the input," Ashley said.

I hovered about twenty-five feet away from the Alpha section of *Horizon*—the bottom, aft section. That gave me a

cushion of about fifteen feet between the ship and the tip of my blades. I didn't want to get any closer in case a gust of wind pushed me toward it.

Slowly I started to circle around the ship. I steadied my head, aiming the infrared camera as I did the rotations. My goal was to use the scanner to get a complete picture of not just the surface but what was beneath it. I would circle around and around the ship, each time making a visual and infrared inspection. I figured I could do three feet at a time, so I'd be doing a lot of rotations.

I did one pass and then another and a third and fourth. Nothing that I could see. I'd have to do another six circles to cover the entire aft section.

I kept going, trying to go slowly to allow both my eyes and the scanner to pick up any small fault. I also didn't want to move too quickly in case I started to get dizzy. This was going to require over seventy rotations around the ship—assuming I could get to the highest level.

“Can you give me any feedback about what you're seeing?” I asked.

“Images are strong, but we're not seeing any fractures, faults, pitting or, well, anything except a smooth skin,” Ashley said. “Are you seeing anything different?”

“Negative. Smooth. Not even a dimple. I expected if there was going to be a problem, it would be in the Alpha section, where the fire was, but there's nothing. I'll keep climbing.”

“Stay focused,” Teal said. “Higher up you're more likely to get stronger crosswinds.”

“Roger that. I’m going to keep climbing.”

I continued to push the accelerator, pushing the blades a little faster and rising up. This was going to be a long ride going nowhere, but if I was right, it was the start of a 150-million-mile journey home.



We’d reconnected the communications array and received a message from Mission Control basically asking “what the hell” was I doing in the helicopter. I figured they had to know what I was doing, since it was pretty obvious, but they’d ignored that point. Was it because they didn’t want to tip their hand, or were they genuinely unaware that I’d been scanning the hull of the ship?

They had called my behavior “unacceptable,” “dangerous” and a “violation of a direct order.” Teal joked that they were going to send me to my room and ground me—for 500 days. Both she and Ashley had agreed that if Mission Control tried to discipline me by taking away my commander ranking, they would both refuse to take over.

Before giving them any response, we’d done a complete analysis of the data from the infrared camera. And then done it again. And a third time. There was no question. The camera had not detected even one cause for concern. The hull was intact and free of faults, fractures and damage. We hadn’t answered their questions in our response, but we had sent them all the data from the scanner, and I’d recorded a voice report saying that “upon visual and infrared inspection”

I couldn't detect any problem with the structural integrity of the hull of *Horizon*. Confident in what we'd seen, we'd sent off the message. We'd also asked them, at Teal's insistence, a direct question—"Did you lie to us?" I couldn't wait to hear how they'd answer that.

The scan was not complete because the helicopter had a ceiling of about 185 feet. The top 35 feet of *Horizon* were above my range, although I'd looked up and aimed the scanner up as high as I could. I wondered if Mission Control was going to tell me the fault was in those 35 feet. And if they did say that, was I going to believe them?

"Incoming message!" Teal said.

"Let's hear what they have to say."

Dr. Fernandez appeared on the frozen screen. I hadn't expected her. I had to figure that having the co-chair of the International Mars Mission Project reply meant this was not being taken lightly.

"Isn't it the middle of the night in Florida right now?" Ashley asked.

"It's four in the morning," I replied.

"That explains why she doesn't look that happy," she said.

"And a bit like an unmade bed," Teal added. "You'd think somebody would have told her to pull a comb through her hair."

"I think we're about to be spanked," Ashley commented.

"Nobody's arm is that long. Maybe they're upset because they got caught. Either way, this is going to be interesting," Teal said.

"Push *play*," I said.

“Good evening, Mars mission members,” Dr. Fernandez began. “We are aware that it would have been very difficult for you to receive the news that your return to Earth has been delayed.”

“Five hundred plus days isn’t a delay,” Teal muttered.

“And I really want to thank you, from all of us here at Mission Control, for taking those extra efforts to provide us with additional data concerning the ship.”

“So far she’s being polite,” I said.

“That’s what people do when they’re getting ready to pounce on you,” Teal said.

“We know that Houston was risking his well-being to do the scan, and despite his going against direct orders not to fly the helicopter, we understand.”

“That was at best a backhand swipe at you, Houston,” Ashley said.

“First off, we want to confirm that the infrared scans you produced did not show any structural damage,” she continued. “Your findings were correct.”

“You were right!” Ashley exclaimed. “There was no—”

“However, your external examination was incomplete and not extensive.”

“This is where she’s going to tell us the fault is in the top few feet we couldn’t examine,” Ashley said.

“The level of structural concern we noted is not something that can be detected in that level of searching,” she said. “During the test firing we were able to detect a vibration that signaled the difficulty.”

“Is she telling the truth?” Teal asked.

“They were getting telemetry on everything, but I don’t know,” I answered.

“Those readings registered a significant increase in vibration, almost 20 percent above what we would ideally hope for. We can anticipate that those readings could become significantly greater as more acceleration and thrust are applied. It is because of these readings that we decided, in consensus with the entire engineering team, that we couldn’t risk liftoff.”

That was it. There really was a reason.

“Further, we understand that you’re all under a tremendous amount of stress and strain. You have done something that is truly remarkable. The way you have come together as a team after the tragic loss of the senior crew members is something that’s almost beyond parallel in the history of humankind.

“With that all explained, we hope you’ll understand that we would never lie to you.” She paused. “At times we choose to withhold information until we are certain of the facts. Ultimately the messages you receive are always my decision, and I apologize for any role the messages may have played in your questioning our information and decisions.”

“Is she saying she’s sorry?” Teal asked. “I didn’t think I’d ever live to see that.”

“Help is on the way. In the meantime, we want you to do your best to stay healthy and alive. Houston, no more helicopter rides, all right?”

“No danger of that,” I answered the screen.

“You have to know that your safety and your lives are the most important things to us here at Mission Control. End of transmission.”

The screen went blank.

“That’s that,” Ashley said. “It was good to have hope while it lasted.”

“I don’t know,” Teal said. “It would have been more convincing if she hadn’t ended on such a big lie. Do either of you think she puts our lives above the ongoing Mars mission?”

I shook my head, and Ashley did the same.

“The ship always vibrates when it launches,” Teal said.

“Like crazy,” I agreed.

“Houston, can you find out everything you can about vibrations and the specific limits and guidelines? Can you do that?”

“It’s all here in the flight manual. I can find anything.”

“Then let’s find out. I just know it’s better for ongoing Mars missions if we stay right here on the planet. That we don’t leave. That there’s ongoing interest because we’re here. It just seems too coincidental that what’s in the best interests of the program is what’s happening to us—having to stay here to be rescued.”

“I’ll look into it,” I said.

“What message will we send back?” Ashley asked.

“We’re not going to send them anything back for now. Let them sweat a bit. We’ll answer when we’re good and ready,” Teal said. “Agreed?”

“Agreed.”

Twenty-Six

“Good morning,” Teal began. “This is a continuation of the messages that we have been exchanging with Mission Control over the past ten days. We have chosen to agree to disagree with your assessment.

“Our analysis of the data suggests that the 4.8 percent vibration level, which is 20 percent higher than expected, is still within an acceptable level of safety and tolerance,” Teal continued.

“And it is well within the range of the specifications for *Horizon* and in fact lower than the vibration levels recorded on three of the last five shuttle launches,” I added.

“I should also jump in here to say that this decision reflects the unanimous opinion of all three members of our crew,” Ashley added.

“And that decision,” Teal said, “is that we’re coming home on schedule. As of the time you will be receiving this message, it will be almost exactly T-minus three days until our launch

from Mars. This is not me misspeaking. In three days we will be executing the launch sequence and lifting off from the planet.

“Our plans are to execute the launch at 19:50, Eastern Daylight Time on July 30,” I added. “After a flight of approximately seven minutes, we will be in Mars orbit. We will initiate at least one partial rotation before using the OMS and Raptor engines to place us on an interception course with Earth.”

“This is our decision,” Teal continued. “We are doing this with full knowledge that you do not agree with this decision, and we take full responsibility for the consequences of our actions. Even if those consequences mean our deaths.”

“We’re aware that you are not in agreement with our decision and will try to convince us not to launch,” Ashley added. “We will be launching.”

“Ideally you will respect our decision and we can work together,” Teal added. “As such, we’re hoping you’ll send the final remedies for us to feed into the onboard computers. If not, we’ll rely on the previously sent numbers and computations, and the calculations, knowledge and skill of Commander Williams. You can choose not to help us, but you can’t stop us. And while we take full responsibility for this launch and absolve the International Space Agency of all responsibility if the launch is not successful, you should also know that you will be held responsible if you choose not to provide the final launch information.”

She was ending with a not-so-subtle threat. *If you don't help us, everybody will know, and you will be responsible for our deaths even if you weren't responsible for the decision to launch.*

Teal turned away from the camera to first Ashley and then me. “Anything else either of you’d like to add?”

“I think that sums it up,” Ashley said.

“For me too. Oh, wait. See you on February 28,” I said.

“End transmission,” Teal said, and then used the remote to turn off the camera. “Anything else we should add or edit out before we send it?”

“We said what we needed to say,” Ashley said.

“As long as you both know that no matter what happens, there’s no way they’re ever going to let us go back into space again,” Teal said.

“I think that’s just fine with me,” I said. I chuckled.

“What’s so funny?”

“I think Yuri and the colonel would both be proud of us.”

Twenty-Seven

We were strapped into our chairs. Me as pilot, Ashley at my side, and Teal working the communications panel behind and to the right of us.

“Any word?” Ashley asked.

“Negative,” Teal said.

“How long before liftoff?” I asked.

“T-minus five minutes and twenty-four seconds and counting,” Ashley said. “Is everything programmed and ready to go?”

“Roger that,” I said. “Let’s focus on the numbers.”

In a normal liftoff from Mission Control, the technicians and engineers would be monitoring all the numbers, dials and gauges. Up here, so many minutes away from them, they couldn’t do that. They weren’t with us, but it wasn’t like they would have been actually with us anyway.

Ashley started reading off the numbers that indicated the pressure in the three fuel tanks. As soon as she finished

those numbers, Teal read off another series of numbers that were associated with operation systems. There was an order they were reading them in so that I knew what they meant according to their place in that order. My job was to listen, drink those numbers in and make sure they were in the range where they were supposed to be. So far, so good.

“Do you think they’re going to send the final remedy?” Teal asked.

“They probably think we’re bluffing.”

“But we’re not bluffing,” she said.

“No. We’re going. If I don’t have the numbers in the next three minutes, though, it doesn’t matter. I won’t have time to make the adjustments.”

“Couldn’t you just delay a minute or so?” Ashley asked.

“That would throw off all the calculations that have already been entered. We have to trust that those original numbers haven’t changed much. I’ve run them, and they’re right.”

“You trust the numbers, and we trust you,” Teal said.

Over the past three days we’d had more than two dozen messages and half as many orders telling us we didn’t have permission to lift off. At one point they even threatened to do a manual override of the ship so we couldn’t lift off. When we told them Ashley had disabled that function, they were more than angry. I didn’t think I’d ever received such a scathing message from anybody as the one we’d been sent by the co-directors of the program. You could actually see little bits of spit coming out of Dr. Fernandez’s mouth and hitting the camera.

The most difficult messages to ignore were from our families. Somehow they'd all convinced themselves that their child was innocent and was being manipulated by the other two. There was no point in trying to correct that message, because we figured Mission Control simply wouldn't allow such a message to be heard by them.

So today we'd decided not to communicate other than to send back one-word replies to each of their messages: "Roger."

"Pressure building to pre-ignition," Ashley said.

"That's within range. Time."

"T-minus three minutes and eighteen seconds," Ashley replied.

"Roger that."

We had also sent video messages to our families to be released if we didn't make it. And that was a possibility. Any launch, at any time and any place, was one of the most dangerous moments of any space mission. That's when people died. And here we were, the first launch from Mars, on a ship that had been out in space longer than any other ship in history, that had been exposed to the Mars climate and sandstorms, and before that a fire, and that now was being piloted by a teenager without final remedies and formulas from Mission Control and was being launched against their wishes. Did that pretty well cover it?

"We can still call it off, right?" Teal asked.

"We could."

"And we could recalibrate, rework the numbers and go in a few days, right?"

“It would be a lot more dangerous. I’d have to calculate everything myself because the preliminary numbers Mission Control gave us would be potentially more corrupt.”

“That’s what I thought,” she said.

“Do you two want to call it off?” I asked. “Teal...Ashley?”

There was no answer for a few seconds. Was it true? Was I the one who was actually manipulating them, making them go, risking their lives against their will?

“Not a chance,” Teal said. “Let’s do it.”

“Me too. Two minutes and thirty—”

“Incoming message!” Teal said. “It’s numbers...just numbers.”

“Read them out—quickly.”

She started reading out the numbers, and I compared them to what I’d already entered into the launch computer. The first nine were exactly the same. The tenth was off by one. I put in the remedy. Three more were identical, there was one more switch of a digit, and the final two were identical.

“There’s also a message,” she said. “It’s strange. It’s, and I quote, ‘The beast is best felt. Shake, rattle and roll.’ What does that mean?”

“It’s a quote from Michael Collins about liftoff,” I explained. “It means that no matter the numbers or the computers or anything, the pilot has to feel it in the seat of his pants.”

“T-minus one minute and counting,” Ashley read out.

“Engaging launch sequence,” I said.

I turned on the computer, and now the launch sequence was being done automatically.

“If this somehow doesn’t work...” I said.

“It’s going to work,” Teal said.

“We know it’s going to work,” Ashley agreed.

“I said *if*. If this doesn’t work, I want you to know that a person could never hope for two better friends and mission mates.”

“Thank goodness. I thought he was going to say wives,” Teal said.

“T-minus twenty and counting,” Ashley said.

I didn’t need her to count it down anymore. From where I was strapped in, lying on my back, I could see the big digital timer above my head.

Horizon started to shake, to vibrate more strongly. The engines were starting to engage. There was nothing more to do but enjoy the ride. Wait—there was one more thing. We were still attached to the podium that held us in place!

I reached out and hit the first series of three buttons. The reds became green. Then the second set of three right beside it. Greens appeared. And then the third set went green, but with the fourth set there was no change. The lights stayed red. Did that mean we were going to drag the fourth leg up into space with us? Would the extra weight keep us from obtaining orbit? We’d been taking off items that weighed only a few pounds to lighten the load, and this weighed thousands of pounds. I smashed my hand against the controls, and the lights turned green.

Ashley and Teal both turned to me, questioning what I’d just done.

“Giving it a little pat for good luck,” I said. There was no need to tell them.

“Ten...nine...eight,” Ashley read out.

The ship started rumbling even louder as more fuel was fed to the engines.

“Five...four...three...two...ignition!” she yelled.

The ship shook even harder. If it was going to fall apart from vibrations, this was when it was going to happen. Was anything happening? And then I felt it. We were rising up. I could sense it.

“Shake, rattle and roll!” I yelled.

I reached out and hit the timer. This burn was going to be seven minutes and seventeen seconds. The computer would shut off the Raptors and the OMS would take over. I just had to watch to make sure both of those things happened.

We started a slight tilt to the side. That was expected. The chairs rotated ever so slightly to accommodate the change in attitude.

The vibrations increased again. We were accelerating, and even the thin Martian atmosphere was working to slow us down, while the gravity of the planet tried to drag us back down to the surface.

“Elevation?” I asked.

“Two thousand four hundred and fifteen feet,” Ashley read out.

I did one more quick calculation. That elevation was gained in less than thirty seconds, plus we’d also moved down course from the launch site. Were we on course for escape velocity? I crunched the numbers in my head. We were right on track. We’d soon be free of Mars.

The clock kept ticking up and the vibrations of the ship were settling down. The worst of it was over, and we'd held together. Slowly the ship began turning over, until it seemed like we were hanging upside down. The pressure against the straps lessened. It wasn't just *Horizon* that was escaping from Mars, but us and everything inside the ship.

There was a shudder, and for a split second I had a rush of fear. Then it stopped. I looked at the clock. We were at seven minutes and twenty seconds. The Raptors had turned themselves off. We were in orbit. We were on our way home.

Twenty-Eight

It was so beautiful. I couldn't take my eyes off it. A blue marble floating in space. After living for over three hundred days seeing almost nothing but red, followed by two hundred days of black, my eyes drank in the color. When I got back to Earth I was going to find some water—a lake, an ocean, a pool—and submerge myself for hours. I wanted to stand in the rain. I wanted to drink a cool sip of water that hadn't been recycled and reclaimed a couple of hundred times before. And in a few days that would be possible.

We'd already executed a retro burn to bring our speed down to less than twenty thousand miles per hour. Earth was only 420,000 miles away, and by this time tomorrow we'd be in orbit. The day after that we'd be back on Earth.

It had been a long journey. Most of the days had been boring. Exercise, medical tests and routine maintenance had filled the time. One day was like the next. On a few occasions things had been trying, troubling, desperate or dangerous.

We'd had the scrubbers go down—twice—and both times Ashley had been assisted by Mission Control to fix it. We'd lost other less vital systems and had to find our way around them, but these things had been more of an annoyance than anything.

One of the things that had helped pass the time was our conversations with the crew of *Horizon II*. It wasn't like we could wave to each other, but there'd been a point about ninety days into our trip when they were only five million miles away. Their route to Mars and ours back to Earth were not in a straight intercept line because we were both aiming for where the other planet was going to be. Still, at that distance it only took twenty-six seconds for a message to be received. It was practically like a real conversation.

They'd been professional and obviously excited about going to Mars, and they'd had lots of questions for us. They had crew members from six different countries, which was a sign that our work had been successful. More countries had become part of the project, including members of the European Space Agency, which had become reinvolved.

I was a little worried at first that our refusal to wait for them on Mars would color how the *Horizon II* crew saw us. Instead, in our first conversation they had congratulated us on being able to work out the “technical problems” that might have prevented the launch. Apparently Mission Control wasn't telling the world—or even other members of the Mars project—exactly what had happened. The crew had also said they would have enjoyed spending time with us.

Despite the fact that they'd left Earth almost two weeks

after we had lifted off from Mars, they'd reached the red planet and landed successfully eleven days ago. Advances with the Raptor engines and fuel efficiency had meant that they'd been able to boost speeds by almost 20 percent. Our seven-month journey was their six-month trip. The next ship might only take five months.

I'd thought a lot about what it would have been like if we'd stayed. It certainly would have been exciting to welcome them, but that excitement wouldn't have lasted for hundreds of days. We'd done the right thing.

"I thought I'd find you here," Teal said as she floated onto the flight deck.

"Where else would I be?"

"You could be in the galley having a meal, taking a nap in your sleeping quarters, exercising in the gym or relaxing in the greenhouse. I can think of lots of places."

"This is *my* place," I said.

"I thought that was Houston's Rock back on Mars," Teal said. She gestured to my painting—the one Ashley had done—that showed the view from my rock. I'd hung it just off to the side of the main-view monitor. It was my way of remembering where we'd been.

"I guess there's no question that that really is my place now."

The International Space Agency had officially given that chunk of rock my name. A place on Mars would be named after me for eternity. Sometime in the future, other astronauts might take a seat on that same rock. Who knew, maybe space

tourists and residents would sit there eventually and wonder, What's so special about sitting here?

What Mission Control didn't know was that my rock was one little piece smaller than it had been originally. I'd chipped off a piece. It was officially *Mars rock sample number 872*, but instead of being in the storage area along with all the other rocks and soil samples, it was in my pocket. I'd return it to the sample bins and tell them where I'd gotten it, but for now it was mine. It was sort of like a rabbit's foot or four-leaf clover.

Often I'd pull it out to look at it or simply stick my hand into my pocket and feel it. It was my own personal little reminder that what had happened actually *had* happened. Sometimes none of it seemed real.

"Are you going to miss it?" Teal asked.

"The flight deck?"

"All of it."

"You know, part of me is practically counting the minutes until this is all over, and part of me never wants it to end." I paused. "It's almost over."

"The flight will end, but you're still stuck with me and Ashley for at least the next three months before we get a break."

"I think it'll be a lot longer than that. The first month is going to seem pretty much the same as the whole trip."

"The same but with gravity and better food," she replied.

For the first thirty days of our return to Earth, we'd be held in isolation. We'd be staying in a contained, sealed environment. Our atmosphere, water and general life support would operate like we were still in space. During this time we would

continue to be tested medically and observed to make sure we were not harboring any unknown Martian viruses, bacteria or other life forms that could spread and contaminate Earth. It really seemed unnecessary, since we'd already been quarantined on the ship for over two hundred days, but protocol was protocol.

The quarantine period would also be used for debriefing, regaining muscle strength and having *controlled contact* with the media. It would be followed by another thirty days of living at facilities in the space center.

That term, *controlled contact*, was something that had been emphasized. After being away from people for so long, they wondered how we'd interact with others. I had to admit I'd wondered that myself. It wasn't just that we had been isolated. Now the entire world would want to talk to us, ask questions or get something from us. NASA couldn't protect us forever, but they could at the beginning, and they hoped it would at least settle down after that. In any case, there was no escaping it. It wasn't like I could turn off my comm link and go and sit on Houston's Rock on Mars.

We would have protection. We'd be assigned "handlers," which included media people and actual bodyguards. Who would have thought it was back on Earth that I'd need a bodyguard?

The people I wanted to see were my family. They'd be housed at Mission Control facilities. While we were in isolation, all contact would be with glass between us, but at least we'd see them. I wanted to be hugged by my aunt, shake my

uncle's hand, wrestle with the Boo-Boos, but that would have to wait.

Ashley's family was all going to be there. Even Teal's mother had found the time. It probably didn't hurt that she'd been asked to host media gatherings for all our families?

"Do you ever think back to that first day we met?" Teal asked.

"Sometimes."

"It seems like forever ago," Teal said.

"It was 957 days ago."

She laughed. "I was going to ask how you knew that, but of course you'd know. Did you know that I thought you were arrogant?"

"Me!" I exclaimed. "What about you?"

"I was confident," she said. "I also thought you were the cutest guy in camp. That's why I made a switch. So I could be in the same group as you."

"I didn't know you did that."

"Good thing I did, or none of this probably would have happened. If I'd waited for you to make a move, I'd still be waiting."

"I was a fourteen-year-old kid who had just graduated from eighth grade."

"As opposed to an almost-sixteen-year-old on the verge of university," she said.

"Exactly."

The three of us were skipping high school altogether. Ashley would be attending MIT and studying engineering.

Teal would be at school just down the road. She was going into pre-medicine at Harvard. She explained that since she'd already done surgery, she should at least get a medical degree. I hadn't committed to any place, but I had offers to attend both MIT and Harvard—as well as more than a hundred other universities around the world.

What I did know was that I wanted to fly. Not necessarily in space, but I wanted to be a pilot. I liked being at the controls, being free, making split-second decisions and having faith in what I'd decided. I wondered what it would be like to join the military and fly the fastest jets, or even something much faster. There was no telling what the future held.

Ashley came into the room. “No surprise finding you two here.”

“Shouldn't I be on the flight deck?” I asked.

“Yes, but you should be allowed to leave so you can eat and sleep.”

“I'm allowed, but I really don't want to,” I replied.

I'd taken to sleeping on the flight deck again the past few weeks, and I took at least half of my meals up there by the controls.

“Isn't all of it being controlled by Mission Control now?” Ashley asked.

“Most of it.”

There had been a gradual passing over of responsibilities to Mission Control as we'd neared Earth. The last course adjustment with the OMS had been done remotely. The same was true for the series of retro burns that had slowed our approach speed. “My only role was to monitor and confirm the instrument readings.

Are you feeling sad that you're not going to be the one bringing us into orbit?" she asked.

"It's more efficient for them to take the controls."

"Nobody said anything about efficient," Teal said. "Are you sad?"

"I guess part of me would have liked to finish what I started, but I'm also relieved that I can just be a passenger."

The last two steps were now out of my hands. Mission Control was bringing us into orbit, and then we were docking with a shuttle that would bring us down to the surface. As we got on to the shuttle, other astronauts would come aboard *Horizon* to take charge. Eventually they'd be the ones to bring it down to Earth.

"We know you could bring us into orbit and down to the surface," Ashley said.

"We have complete faith in you," Teal agreed.

"I appreciate that, but this is better. Besides, it's out of my hands now."

"It doesn't have to be," Teal said.

"I don't think they're going to change their minds," I said.

"Who said anything about changing their minds?" Ashley asked. "We could just take over manual control again. We've done it once already, and I could certainly take out the systems so we could do it again."

"Even if we weren't really going to do it, wouldn't it be worth it to tell them that's what we're going to do?" Teal said. "Can you imagine the panic at Mission Control?"

We all started laughing.

“We’re not going to do that or even hint that we are,” I said. “It took half the trip back home to convince them we could be trusted to follow orders.”

“I wonder how many people know that we defied orders to come back,” Teal said.

“Not many,” Ashley said. “Maybe a half dozen. It’s like the best-kept secret in the world.”

“I still think Yuri and the colonel would have approved—or at least gotten a chuckle out of it.”

“And Commander Ingram would have blown a fuse!” Ashley added.

“She would have,” I agreed.

We all got silent, and I knew what we were all thinking. Once we had completed all that was required post mission, we were going on a trip spanning three continents and four countries. We’d be meeting with Commander Ingram’s husband and parents. And then Colonel Sanderson’s children and grandchildren. Following that we were to fly to Canada and spend time with Frank’s wife and the baby who was now a toddler. Then we’d be off to South Korea to meet with Dr. Kim’s family, and finally to Russia to meet with Yuri’s family.

At each stop we’d offer our condolences, give them back personal items, answer questions and just grieve with them. The visits were being done for the lost crew members and their families, but also for us. We needed to say goodbye to our friends.

The one question that hadn’t been answered was one I was asking myself. Nobody knew that it was me who had

pushed the button to open the air lock. None of them knew I was the one who had caused their deaths. Would I tell them? Should I tell them? If they asked me directly, I knew I really didn't have a choice.

"How about if we go and share a meal together?" Teal asked.

I didn't answer.

"Earth will still be there when you come back in an hour," Ashley said.

I nodded in agreement. It was still going to be there, only twenty thousand miles closer. They led the way, and I stopped at the hatch. I turned once more to look out the window. There it was directly in front of us. I could see our home, and it *was* beautiful.

"Houston," Teal called out. "Is there a problem?"

I smiled. "No, there isn't. Not anymore."



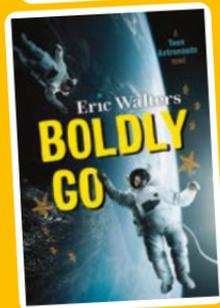
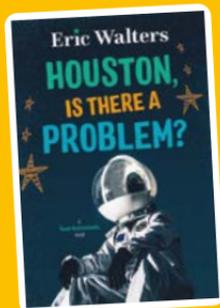
Eric Walters is a Member of the Order of Canada and the author of over 125 books that have collectively won more than 100 awards, including the Governor General's Literary Award for *The King of Jam Sandwiches*. A former teacher, Eric began writing as a way to get his fifth-grade students interested in reading and writing. Eric is a tireless presenter, speaking to over one hundred thousand students per year in schools across the country. He lives in Guelph, Ontario.

THE CHANCES OF SOMETHING GOING WRONG ARE ASTRONOMICAL.

HOUSTON WILLIAMS WAS THRILLED to win a scholarship to attend a space program at NASA. What he didn't realize was that organizers were recruiting people for a top-secret research project aimed at studying how space travel affects people of different ages. After months spent on the International Space Station conducting a variety of experiments, Houston is surprised to learn that he and his two friends, Ashley and Teal, have been chosen to join a highly political mission to Mars. But after tragedy strikes, the teens are forced to continue the mission on their own.



ALSO IN THE
TEEN ASTRONAUTS
SERIES:



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For more information, contact Kennedy Cullen
1-800-210-5277 • kennedy@orcabook.com



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