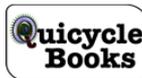


# THE INTREPID

Dawn Of The Interstellar Age



Arnie Benn

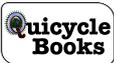




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*Man will become better when you show him what he is like.*

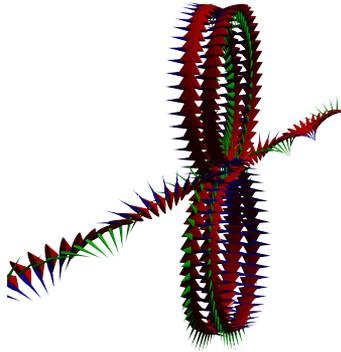
Anton Chekhov





NOTE:

1. The science in this book is real and based on current and recent (peer-reviewed) research. With the exception of only one story element (...or maybe two).
  - You do not need to know science in order to follow and enjoy this story.



2. The Appendix at the end of the book contains:
  - a **floor-plan** of the spacecraft
  - the cast of **characters**
  - a **glossary** of scientific terms for those interested in delving a little further<sup>1</sup>

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<sup>1</sup> For more on the image above, see the terms “**Antimatter**,” “**Electron**,” or “**Positron**” in the glossary.

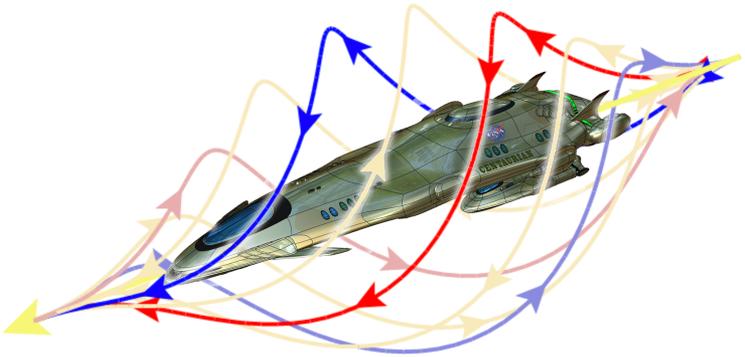
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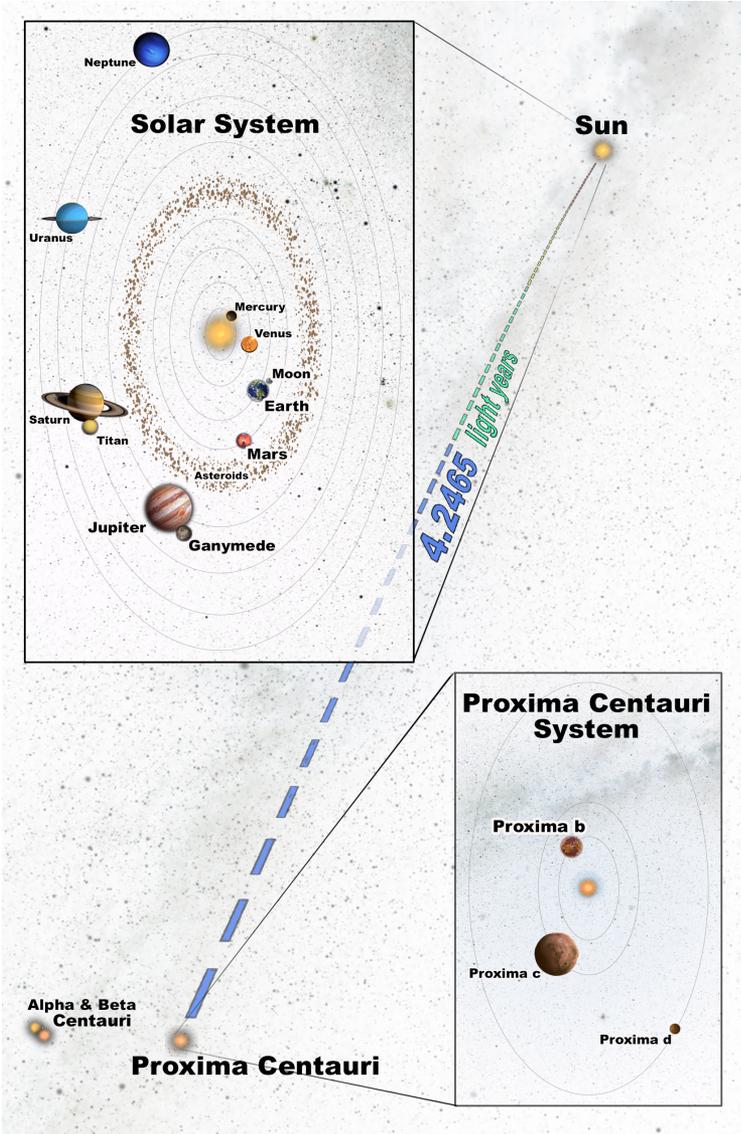
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PART I: *Rendezvous*



# SPACE MAP



## CHAPTER 01:

*Awake*

Aksel Bolt is becoming aware.

Consciousness emerges slowly, falteringly, the deep sleep state fighting to resist his waking. It is as if cells are reanimating individually, with only a vague sense that they may be part of some whole. He searches the haze but cannot yet make out who or where he is. He is not yet a coherent thing.

Awareness grows. He now senses that he is in a small chamber, not much larger than a coffin, but he does not feel uncomfortable. He feels a bit cold, but the surface beneath his body is warming. His muscles feel heavy, despite the lack of gravity, and he is not sure he will be able to move even if he wants to.

*Open your eyes. If you can.*

The hibernation pod has a faint vinyl smell. Understanding is returning faster now. He is on a spacecraft. He is waking from hibernation. When is this, and where is he going? *Fear is the default human emotion*, he finds himself recalling, a reflected glimmer of past wisdom learned. *No reason to fear until there's a reason to fear.*

The warming seems to speed up his circulation. He can hear his pulse now, accelerating back up to normal bit by bit as it throbs past his inner ear. His eyes begin to achieve focus. There is a glass window above his face, but it is clouded by a thin film of condensation.

He is not feeling so cold anymore. His muscles still feel heavy, but he realizes it is really tiredness rather than heaviness. He remembers now that the effect will wear off after a few hours with the help of a cocktail of supplements. His mind is becoming clearer by the moment. He is Commander Aksel Bolt, captain of the *Centaurian*, and if he is being awakened, it means he has been in

hibersleep for the past twenty eight and a half years. They must be almost there.

The pod will open in a minute or two, and he is glad to have the time to reflect, to catch his thoughts. They had left from the small developing Mars colony in 2068. One of its primary purposes was to serve as a staging point for both planetary and interstellar exploration. The first interstellar mission was always going to be to Alpha Centauri because it is the nearest star system to ours. Proxima Centauri is the closest of the three stars in the cluster, and it has at least three planets. One of these, Proxima b, is solid and only slightly larger than Earth. That is where they are going. They are frontiersmen, Mankind's first interstellar explorers, valiant and unafraid.

The trip takes twenty nine years of Earth-time. The ship is traveling at 15% of the speed of light, though, and the theory of relativity therefore dictates that time will be distorted for those on board. They will only experience about twenty eight and a half years of travel time. However, hibernation technology has a genetic component and also operates at reduced body temperatures, which further slows metabolism. This means that, by the time they get there, Bolt's body should only have endured a little more than four years of actual biological aging. That is not a bad deal, he thinks, especially considering that average human life expectancy has already passed the century mark. A fair price for the trip of a lifetime.

He cannot help reflecting on the quirks of this new age of relativistic travel. Aksel Bolt was born in 2018. He was a 50 year-old Danish national hero by the time they left Mars in 2068. Now, even though he has been asleep for just over 28 years, biologically, he is only 54. He will return to the solar system a mere eight biological years older, while everyone there will have endured 58 years. If he had a twin brother to leave behind on Earth, he would return 58, to find his brother 108.

The closer we travel to the speed of light, the more time slows down for us. The further we go, the more dramatically this will cause our timelines to differ, when we return, from those we

left behind. If we could ever travel at 95% of the speed of light, the crew would experience just over a year of travel time in each direction to Proxima Centauri, although on Earth, they would still have to wait nine years for us to return. For every trip we take, the age gap between us and our loved ones would increase by nearly seven years! If we go even faster and further, the age gaps widen much more dramatically.

There is no doubt that interstellar travel is going to play havoc with relationships. For others, that is. Bolt has no relationships left to concern him. No twin brother, and no family to speak of. Since his divorce, Olga has not wanted too much to do with him. She is always polite, of course. Mutual respect had never waned between them, but the amount of time a 'spacer' spends in space makes marriage to a non-spacer very hard to sustain. The moon. Mars. Then the exploration of Ganymede and Titan. Years of frustration grew to resentment, and a lack of fulfillment morphed into disdain, and somehow things were never quite the same after that. Fortunately, they had no children to witness the gradual decay of their marital orbit, and he had said his fond farewells to his father before he died. Out here, Bolt feels that his crew are his only family now, and he would do anything for any one of them. He certainly does not feel that missing the next sixty years of life on Earth will be particularly hard for him. For some of his crew, though, embarking on this mission must have been much harder. Then again, they all chose this. But no matter, he must remember to acknowledge them again for their sacrifice.

He tries to move. First, fingers and feet. They work. He had been concerned about muscle atrophy, but the doc was right. Nice looking too. Attractive brunette; dark engaging eyes. Not that it should matter in the present context. They all understand enough about human survival instinct and sexuality not to allow its false promises to divert them frivolously. No one has a problem with people enjoying each other in a consensual way, of course, but this mission is not about fun. It is too important. Historic. They have to keep their focus. *He* has to keep his focus. And certainly not interfere with others keeping theirs.

Bolt is surprised how good he actually feels. Twenty eight years of stasis and he only has that slightly drunk feeling you get from sleeping a few hours too long. Remarkable.

The pod beeps. The pressure changes as its seal cracks open, inducing a pressure imbalance in his middle ear. So many years of being a pilot but he still hates the sensation. A practiced yawn of his jaw and the pressure equilibrates.

As the lid opens, the air that mixes into the pod from the medical cabin tastes somewhat stale. Bolt lies there for a few more moments. It is his job to rouse the crew. If he does not, the system will auto-wake them soon enough. There is time. He will probably have a cup of hot tea first. The others will probably appreciate it if he prepares some for them also. Coffee for the doc and Yarrow, of course. They are cranky before their coffee.

The thought of a gently steaming cup of tea gives Bolt the added inspiration to rise. He rolls onto his right arm, freeing himself from the clips holding his body against the pad in lieu of gravity, and props himself up slowly. This is actually easy in zero-G, though he still helps his knees find their way over the edge of the pod opening. He reaches a seated position, which feels strange because it does not feel any different from lying down. And also because, if he thinks about the geography of the ship, his head is pointing in their direction of travel. He is sitting on the edge of one of four crew pods that are mounted on one wall of the medical cabin. The remaining four are mounted on the opposite wall.

On the bulkhead beside him, the monitor of his hibernation pod illuminates the space above its dark smooth surface with a collection of green holographic icons, symbols, and numbers. His eyes are still adjusting to focus, but the colors are clear enough. His life signs are within normal parameters. One less thing to worry about.

He can see the doc's hibernation pod to his left. Her holographic monitor also looks good — projecting all green. That is a relief... although, something is bothering him. Something in his field of view does not seem quite right, but it is taking a long moment for his brain to zero in on exactly what it is. Then it snaps

into focus. The time elapsed on her hibernation monitor reports 7 years, 0 months, 2 weeks, 3 days, and change. That must be a mistake. He glances back to his own monitor. It reads the same. He had not noticed it the first time, but now it strikes him with sobering force. Had they only been under for seven years? Seven out of twenty eight? That means they are only a quarter of the way there, out in the middle of interstellar space. This is not good. What had gone wrong? If he has been woken early it means there is either a malfunction or the system has been triggered early by mission control. Neither prospect is particularly comforting. And if it *was* mission control, the message would have had to be sent about a year ago in order to reach them all the way out here. That also means there is no way to have a two-way communication with home.

Commander Aksel Bolt is now wide awake. He shifts his weight forward, easing himself off the surface. Floating, he reaches for the bulkhead beside him and uses it to turn himself around. Apart from the seven other hibernation pods, the medical cabin sports two treatment stations and several storage compartments for equipment, supplies, and medication. He thinks about grabbing some of the muscle supplements right away, but his concerns are overriding. Even the tea will have to wait. Getting to the controls is now his first priority.

*What the hell is going on here?*

CHAPTER 02:  
*Protocol*

The ship's medical doctor, Joanne-Leigh Elias, is sitting up in her hibernation pod, gaining her bearings. Emerging from the grogginess of hibernation, the 35 year-old Australian physician and geneticist finds herself thinking about, of all things, the first boy she kissed — the first boy she *really* kissed. Nicky Altshuler. She had been seventeen at the time. She had always been pretty, so there had been no shortage of opportunities if she had wanted them sooner, but she had had other things on her mind. Not to mention that she found her knowledge of anatomy actually made all the sexual stuff and bodily fluid transfers seem a little grosser than the romantic vision of them that everybody likes to entertain. Do people know how many different kinds of bacteria live in their mouths? The boy she kissed was so cute, though, that she was also willing to imagine his mouth bacteria being a whole lot cuter than bacteria were everywhere else in the universe.

Elias is not quite sure why she is thinking about Nicky Altshuler now, though. It must be because her mouth feels a little dry from hibernation. Whenever that happens, and her tongue feels a bit 'hairy,' she is reminded of her oral bacteria. Coffee will help, she thinks, and it will also help her wake up. *And then I would love to brush my teeth.*

"Are we there?" Elias asks in Bolt's direction.

Bolt floats beside her, giving her a moment. "No. Not yet."

Elias looks at him, suddenly concerned. "What does that mean?" She directs her gaze towards her monitor and reacts. "Seven years? Shit. That's... We're like..."

"Only a quarter of the way there."

"What's happening?"

“Mission Control called it in through another ship. They activated my auto-wake. We’re going to rendezvous with them.”

That is even more surprising. “Rendezvous?”

“Before that, though—” he tries to continue, but the doctor in Elias is beginning to remember and reassert itself. The captain, like her, has just awoken from a long hibernation.

She interrupts him. “I need to look you over. Are you feeling alright?”

“I’m fine,” he assures, trying to redirect her. “Jo-Leigh...” he locks gaze with those dark, penetrating eyes until he knows he has the attention of the mind behind them, “Eesa didn’t make it.”

Elias turns her head, involuntarily, toward the pods on the opposite bulkhead. Red symbols dance urgently above the monitor beside Eesa’s pod.

They are both silent for a moment, contemplating the loss of their dear friend. Every astronaut knows the risks. In order to reach their cruising speed of  $0.15c$  — 15% of the speed of light, a blistering 45,000 kilometers per second — they have to perform a sustained acceleration for seven and a half days straight. It exerts a force seven times stronger than Earth’s gravity on the crew. Such a sustained 7-G burn represents a brutal assault on the frail human body. Normal activity is not practical under such conditions. The crew therefore enters hibernation prior to acceleration, and in order to survive it, the hibernation pods are programmed to rotate slowly. This prevents the blood and lymph fluids from being forced to the front or back of the body and being held there, which eases the strain on the cardiovascular system. Without this rotation, the body will suffer a combination of multiple strokes, blood deprivation, and tissue death. The only mercy in such a death is the lack of consciousness during hibernation.

Elias had once asked why the acceleration could not be done at lower G and for a longer period of time instead, and she had learned that even going down to 4-G for an extended engine burn does not decrease the risk of fatality as much as one might hope. It also lengthens the journey significantly from the point of view of those on Earth, who will not be in hibernation and who will

wait — and age — at the normal rate. So it is a trade-off. Risk versus time.

Elias turns her body and pushes off in the direction of Eesa Yussef's pod. "When?"

Bolt follows her. "Looks like the rotation mechanism failed. That would have killed him early in the long burn. So probably seven years ago."

Bolt becomes pensive. It is painful to think about his long-time friend and comrade, lying entombed beside them for seven long years as they hibernated peacefully, unaware. He does not want to think about how the loss of his second-in-command and a brilliant engineer is about to affect the mission. "It's going to be harder now, for all of us." He hears himself repeating, almost involuntarily, "seven goddamn years."

Doctor Elias briefly examines the holographic display above the monitor pad beside Eesa's pod, scrolling through its data log with a finger gesture waved through its translucent navigation icons. It appears to respond to her touch almost as if the air itself forms a tangible, 3-dimensional fluid screen. "Hibersleep started at T plus thirty one hours and forty two. Looks like hemorrhaging only at T plus thirty two oh seven." She is surprised that it took so long.

"He always was a tough son of a bitch." They both admit a nostalgic smile.

Elias concludes, "Cardiac arrest at T plus thirty two nineteen."

She moves to the pod and gazes through its partially misted window. Her eyes well up as she looks down at the pale, lifeless form preserved within. While she had not known Eesa for as long as Bolt had, the crew had all lived and trained together on Mars for a year before the mission launched. As the crew doctor, she had a responsibility to know the full medical history of each team member, and this allowed her to spend quality time with each of them and really get to know them in ways that their other crew mates might not. Eesa was a sweetheart; they all liked him.

"I couldn't save him this time," reflects Bolt.

“This time?”

He looks at her, remembering. “This one time we were in a pretty hairy dog-fight, in the NATO no-fly over Oman in May of ’41, just before the end of the war. Eesa was pretty cocky for a rookie, and this one Saudi F-39 got a great lock on him, but he caught one of my IRIS-X's up the tailpipe instead, and just in time too.”

“It’s no one’s fault, Aksel.”

Elias knows that there is nothing she could have done for him either, even if she could have gotten to him earlier. Even if she had been woken as soon as the system registered his flatline, it would still have taken at least twenty minutes for her to come down from hibernation. Add to that the time it would have taken to access his pod, and she would have been trying to do all of this saving during a 7-G long burn. Just not feasible. Eesa was a casualty of space travel, plain and simple.

“We’ll keep his pod sealed,” she says.

“Yeah.” Commander Bolt cannot allow himself the luxury of grief. There is too much to do. “We have to get the others up.”

“All of them? Out here?” She realizes that she still knows far too little about the situation they are in. “How can another ship rendezvous with us?”

\* \* \*

With a clearer head, and having listened to the message herself, Doctor Jo-Leigh Elias floats beside one of the other hibernation pods, waiting for it to open. It should be any second now.

There is an order to these things. The captain is woken first, then the doctor, and then the navigator. According to Global Space Administration protocols, you should always have the doctor present when people are coming out of hibernation in case there have been complications. If there have been, there is usually not much the doctor can do anyway, so she is not really sure why they make such a big deal about it. The only official exception is that the

captain must be woken first. After a captain and a doctor, a ship will need to know where it is going, which is why the navigator is third. This also begs the question in her mind, 'Why doesn't the captain know how to navigate?' Be that as it may, the upshot is that the third person to learn that things are not going according to plan on this mission is about to be Doctor Allison Yarrow, their 38 year-old American astronomer and navigator.

Elias and Allie Yarrow had always gotten along well. Yarrow had been on the Mars base for a couple of years already by the time Elias got the post there as one of the three base doctors. The blonde astro-navigator had been working with Commander Bolt on flight testing the propulsion systems even before they were named to the mission. That work probably played a part in them getting it.

Allie Yarrow had a fighter pilot background, but she had somehow also managed to get a PhD in astronomy while working as a flight instructor after her own training was complete. Elias had always thought that just went to show how much grit and tenacity emanated from this five and a half foot powerhouse of a woman, and the space program loves a double-specialty. Yarrow can be a little bold and feisty sometimes, which probably comes with the territory when you are dealing with the fighter pilot brain, but she is smart and perceptive and she does not suffer fools. Although Elias finds that to be kind of a cool trait, some people mistake it for arrogance.

The glass screen in the top of Yarrow's hibernation pod is clearing now as the atmosphere within approaches room temperature. Elias can see Yarrow's face. She seems so relaxed and peaceful. Absent is the slight furrowing and tilting of her brow that makes her look as if she is analyzing everything that is going on, and finding it a little entertaining.

Across the medical cabin, Commander Bolt is checking the stats on each of the other monitors. Elias figures they will probably wake Jeffrey Rudiger next. He does most of the piloting, even though Allie Yarrow is a talented pilot herself.

The pod gives a short hiss as the seal is broken. This means she is already awake. The lid eases into its fully open position.

Inside, Yarrow is barely conscious. Her forehead furrows slightly as awareness begins to take hold. *There goes the brow.* Elias recognizes the familiar expression, and it is a good sign. The facial muscles are very subtle story tellers, especially for those who know how to read them. They reveal what we are feeling on a subconscious level, no matter what we think we are communicating or even trying to hide. They are usually telling the truth. If Allie's normal sassy expression is the first thing to show up, it means that she is still in there, and that her brain function is probably normal. A stroke or brain damage are always the principal concerns with extended hibernation and high-G, and the brow thing shows that neither are likely. Elias exhales as the doctor and the friend in her can now relax by a couple more increments. *Of course, we are still out here in the middle of interstellar space, she reminds herself, and the mission seems like it may be unravelling, so we should not get too comfortable just yet.*

Watching Yarrow's face finding its footing, Elias imagines that all the pithy words she is usually letting fly are starting to congregate in the front of her brain, realizing that they should probably be getting out there soon, but arguing about who goes first. Forehead muscles test their range of motion. It is becoming a bit of a shoving match in there, but one cluster of sounds seems to be forcing its way to the front, eager to be first out of brain and into action. It manages to squeeze through, emerging as a husky croak from between the astro-navigator's drowsy lips.

“Coffee.”

## CHAPTER 03: *Incoming*

In the main cabin at the front of the ship, Commander Bolt floats in front of the holographic monitors and control panels of the unenclosed cockpit. Through the front windows, the Alpha Centauri star system seems to be guiding them, attracting them, the bull's eye of their target. Like all the other stars in their forward field of view, it appears brighter and bluer than it does from Earth. This 'blueshift,' as it is called, is the result of traveling at such high speed towards the light.

Beside Bolt, the 45 year-old African American aerospace engineer and pilot, Jeffrey Rudiger, consults the monitor before him, reviewing the transmission they had received. "Look at the damn blueshift on the message."

"Yeah," recalls Bolt, "I had to slow it down to make it out."

Bolt is glad to have Rudiger with him. Rudiger knows this ship's systems probably better than anyone else because he designed and built many of them. He had been on the Mars base since 2059, when construction of the *Centaurian* was beginning, and before that, he had been building satellites for the GSA.

Rudiger studies the monitor intently, rotating and analyzing a 3-dimensional holographic representation of the data stream of the message. "That's a *really* big-ass blueshift. They're... Jesus. How fast are they going?"

Rudiger touches the fingertips of his right hand to a set of five exposed metal contact points on the surface of a knob on the control panel. The small patches of metallic skin discoloration on the pads of his fingertips make contact. He blinks as his bio-electronic hybrid circuits process a calculation.

Genetic technology, with its synthetic nucleotides and artificial protein synthesis, had enabled many useful functionalities

to become part of the human experience. The natural genetic system builds proteins out of the amino acid molecules found in nature. By adding two new letters to the ATGC genetic alphabet, scientists could then invent new amino acid molecules that matched up to them, molecules with all sorts of chemical or even metallic properties. They could then use the existing genetic replication machinery to incorporate these artificial amino acids into hybrid protein structures. Living tissues could then be developed with applications that had never existed before in nature.

Biological analogues of many electronic components made it possible to engineer bio-circuitry that operated alongside regular tissue function. This allowed people to achieve, for instance, data processing abilities that could take place internally — along with a little neural interfacing — and that could communicate with external hardware.

Of course, not all hybridization technology was simply computational. Ever since 2040, when the use of genetically engineered hybrid soldiers was revealed in battle, it has been known that we can also use this hybridization technology to increase physical strength. Rudiger does not have those types of modifications, though.

Allie Yarrow floats in from the passage at the rear of the main cabin with two lid-covered cups of coffee. She has had her first sip now so she feels more open to human interaction, but her annoyance is not completely abated. “You couldn’t put the coffee on before you woke me?”

Bolt glances at her. “You’re right. That should have been the priority. What was I thinking?”

“Yeah.”

Yarrow takes another long, brain-affirming sip. At least she feels like she knows a little more about where they stand now. A ship from home is going to rendezvous with them. *How* exactly they are able to do that, given the *Centaurian’s* velocity, still remains to be learned. Yarrow’s old rival from her fighter pilot training days, Amma Rymer, is the captain of the approaching ship, and the reason for this surprise visit is something important enough to get

them all out of hibernation in the middle of interstellar space. *What the hell could that be?* They are seven years from home. They are twenty one years from Proxima Centauri. Rymer's ship cannot be too far away now either or they would not be able to communicate using speed-of-light radio waves in a useful time frame. And if Rymer catches them, it does not necessarily mean she is the better pilot, right?

"We've traveled about a light year already," Yarrow says, "so they must have sent that message a while ago. There were no other interstellar missions scheduled when we left, right?"

"No," agrees Bolt.

With his fingertips on the contact points, Rudiger reacts to his internal computation. "Holy shit. They're doing north of point nine five C."

"How's that even possible?" asks Yarrow.

"Someone's been innovating while we've been sleeping," says Bolt.

Rudiger shakes his head. "No kidding and a bucket of truth."

"You bummed you weren't there for that build?" Yarrow asks.

"Yeah. Kinda." Rudiger focuses back on his monitors. "It's funny. Growing up, my dad and I were always deconstructing and constructing shit in the garage — cars, drones, pretty much any kind of vehicle we could throw a wrench at. Sometimes I just pranked him, so when he went to work, his engine had double the torque or made a huge noise or something. And then he'd do it back to me. It was pretty fun, I gotta say. All about teasing out another inch of performance, you know?"

Bolt is not surprised that Rudiger turned out to be so incredibly adept with his hands and with just about any machine system you could imagine, as well as having such a strong sense of family. Those years, those countless weekends at play, provided a very special space in which father and son could bond over a common passion. It does not happen in every family; Bolt had not

had it in his. Until now, that is, and he knows how valuable Rudiger's unique skill set is to their small family of explorers.

Rudiger continues, "But this..." He points the monitor showing the incoming message. "This is a whole other level. Traveling at speeds like *this* is... I mean, traveling *at* the speed of light isn't possible for physical objects, only for light, but to get this close? I'm pretty blown away, man."

He notices the second cup of coffee in Yarrow's other hand. "Is that for me?"

Yarrow looks at him for a moment before answering. "No." She turns to Bolt. "Are we going to have to stop when they get here?" She does not relish the thought of any more 7-G decelerations in hibernation than are absolutely necessary.

"No. Apparently they can dock with us," answers Bolt.

"Good, because I don't think I can get into that fucking pod again after..." She does not need to finish the sentence. They are all mourning.

Rudiger glances back at the coffee again, and then at Yarrow. "You kidding? It's really not for me?" He gestures towards Bolt, almost indignantly, "He's a tea-totaller."

Yarrow again teases him with a delayed answer. "It's for Jo-Leigh."

"Oh. Ok."

The stoic and always-tough Johnny Bang, 43 year-old Korean-American security officer and back-up medic, floats into the cabin.

Bolt calls to him, "How are you feeling, Johnny?"

Johnny Bang offers Bolt a thumbs-up. "Good, Commander."

The skin of Bang's exposed forearm reveals that he has bio-hybridizations that include myo-metallic muscle fibers for enhanced physical strength, and dermo-metallic integration that gives his skin increased toughness and a faint sheen in the light. He had gotten them when he was in the U.S. army because they were available to anyone doing six years of service or more. The army had been his way of speeding along his citizenship process because

he had only moved from South Korea to the United States at the age of eighteen.

Because he had chosen to specialize as a medic in the army, he elected to get the bio-electronics that would enable him to take vital signs by touch. While he was at it, though, the ones for increased strength sounded pretty awesome too. If you want to help people, having medical hybrid tech and being strong are both really useful. They would allow him to do both of the things that he did best — caring and fighting — but *better*.

Bang's brow is furrowed. "How can another ship be catching up?"

Rudiger answers. "They're going north of 95% the speed of light."

"I didn't think that was possible."

Rudiger nods. "Join the club. The message is crazy blueshifted."

"Shouldn't it be redshifted?" Bang ponders out loud. "We're speeding away from Earth fast."

Even beginner astronomers like him know that redshift means if we are flying away from a radio source, it makes the radio waves seem stretched out to us. That is the equivalent of light shifting towards the redder end of the color spectrum, as if a lens has re-tuned green to yellow or orange to red. It is also what happens when a siren passes and is moving away, making the sound go deeper in pitch. Blueshift means the opposite.

Yarrow clarifies. "No, it's blueshift. If they're chasing us and catching us, they must be going faster than us, right?"

At the rear of the cabin, Doctor Jo-Leigh Elias enters with two other women, the last two members of the crew. They are just now emerging from 'hiberfog,' as Yarrow likes to call that dissipating mental cloudiness after hibernation.

Yarrow releases one of the coffee cups in Elias's direction with a "Jo-Leigh..." and it floats gently over to her.

"Cheers, Allie," says Elias, pushing off towards it to meet the coffee in mid-float.

Rudiger mutters loudly enough for Yarrow to hear. "It's probably cold by *now*."

Bang persists, concerned. "And they're gonna dock with us? Do we even know who they are?" He moves to one of the port holes and peers out into space.

"You won't see them yet," says Bolt, who turns his attention now to the two newcomers. They were the last to be roused, and he wants to give them a moment to recover. Everyone needs to have their wits about them when they discuss the unfolding situation. "You chaps feeling alright?"

The ship psychologist, Doctor Chantana Suco, nods as she moves to a seat and straps into it. The 35 year-old of Thai origin sips from the cup of tea she now holds clasped between both hands. She is a slender figure, and with her legs drawn in close, she evokes the image of a cold cocoa-drinking camper trying to warm herself by the fire. Hibernation can do that to you, giving you a chill to your core that seems hard to shake even with a warm drink, but that is not what seems to be troubling her.

"Can we even dock at this speed?" Suco asks. "Isn't that super dangerous? Can't we hit a particle or something and explode?" She looks to Allie Yarrow for an answer.

Yarrow shakes her head. "Not a lot of meaningful particle sizes in interstellar space, and we're pretty well shielded against the atomic stuff." Yarrow swallows another sip of coffee.

Doctor Elias takes a moment to look her six colleagues over. Technically, they are all healthy, but they have just emerged from seven years of hibernation. Their bodies have experienced about a year of biological aging, which is a lot of physical adjustment for the brain to process during one (albeit extended) period of unconsciousness. Arguably more significantly, though, the body itself has been subjected to temperature changes, both metabolic and genetic manipulation, not to mention sustained high G-forces for over seven days at the start of it all. "Everybody still feeling ok?"

Across the cabin from her, Doctor Lucinda Chen, the 39 year-old biologist and botanist, has floated over to a seat beside Johnny Bang. When she is not emerging from hibernation, she usually

has an alert and analytical eye on the proceedings, even if she comes across as somewhat shy. Right now, though, she looks a little green.

“Cindy?” asks Elias.

Cindy Chen heaves slightly, feeling suddenly nauseous. She is going to throw up. Beside her, Bang reaches quickly for an air-sick bag from a compartment in the bulkhead beside his head, thrusting it at her with an insistent “Chen.”

She grabs it and holds it open in front of her mouth, but nothing seems to happen. She relaxes slightly, and with a shy half-smile: “Actually, I think I’m...” but then she suddenly throws up. It is only the contents of about half a cup of tea. Most of it goes into the bag, but a drop or two float towards the center of the cabin.

Bang moves closer to her, touching her back supportively. “I got you.” He places his fingertip electrodes against her jugular vein, and his bio-electronic sensors are able to assess her vital signs. “You’re ok.”

Chen assures them, “I’m fine,” but she knows it is more of an attempt to deflect her embarrassment. She prides herself on behaving with propriety. Maybe it is her Chinese upbringing, or maybe it is that she prefers people do not take too much notice of her. Either way, there are few things *less* proprietous... *Is that a word?* she wonders... than throwing up in front of other people. Even worse if they are colleagues, because you want the people you work with to think you are good, smart, in control, and worthy of being in their esteemed company. This was certainly esteemed company. Throwing up is only ok in front of family. Families see all the gory stuff; there is no avoiding that. Well, she thinks, maybe if she saw the first deep-space interstellar crew she is a part of as a family — the others all seem to — then it would not be so bad. She feels better about this. They certainly do seem quite attentive at the moment, and the caring seems authentic.

Doctor Elias floats over to them, offering Cindy Chen a moist-wipe for her mouth, and then moving to retrieve the floating drops, which she absorbs into a tissue.

Chen is feeling a little better now. “Sorry.”

Elias stows the wipes and trashes the tissue. “Don’t be silly. It’s perfectly normal.”

Rudiger chimes in, “Yeah, about as normal as hibernating humans in deep space.”

Tana Suco looks up from her tea. The psychologist is feeling somewhat more revived now. “How long ’til they get here?”

Rudiger touches fingertips to contacts again. “Not sure yet but the signal is getting stronger.”

Suco continues, “Commander, if there is time before, I think we should take a little time... it might be helpful at least for all of us to talk a bit... about Eesa. I know some of you were very close.”

She wonders why that had not come out easily. Does she feel like she is intruding? Or was it even more rudimentary than that, the over-management of the over-eager first-time mission shrink?

Bolt nods pensively. “If there’s time.”

Bang, who considers himself quite a philosophical chap in addition to being good at protecting people, decides to contribute some wisdom in his characteristic near-monotone. “Mourning is just our fear of death poking its head out. The rest is... just a story.”

At the cockpit, Rudiger looks over his shoulder towards him. “Easy there, Johnny Bang.”

“You’re not wrong,” explains Suco, doing what she sees as her job of managing the group dynamics, “but we’re hurtling through interstellar space at relativistic speeds in a tin can, so you can pretty much double our instinctive fear of death right there. We’re not unaffected by that. It’s our chemistry. It’s wise not to ignore it, especially when we have important work to do.”

Bang knows he cannot out-argue the psychologist. He withdraws with an “Ok, smarty pants.”

Jo-Leigh Elias feels the need to add: “And maybe we just miss our friend.”

No one talks for a moment.

A *ding* from the radio breaks the silence: another message. Rudiger looks at Bolt, who gives him the ‘go ahead and play it’

nod, and the systems engineer touches the monitor. The blueshifted message plays, though sped-up and at a high pitch. Inaudible.

“Sorry, blueshift. One sec...” Rudiger manipulates the control panel contacts and the message repeats, this time at normal pitch. They hear a woman’s voice, which Yarrow immediately recognizes.

*Centaurian, this is Centaurian Two, please activate nav-lock now. ETA for approach one hour four minutes your time. Auto-trajectory will activate at T minus 10 minutes. We will be going radio dark for deceleration. Please acknowledge receipt. Centaurian Two out.*

Bolt adjusts the microphone of his thin headset and touches the control panel. “Centaurian Two, this is Centaurian... One, I suppose. We read you five by five. Telemetry link for nav-lock and auto-traj are active. We’re all as curious as hell up here. See you soon. Centaurian One out.” He looks around the cabin, making eye contact with each of his crew. “Another one for the history books.”

Rudiger cannot help commenting, “*De*-celeration, if you don’t mind. They’ll be decelerating *down* to point one five C.”

“In an hour,” Bolt adds. “And they’re only starting now?” Bolt and Rudiger look at each other.

“That’s a hell of a lot of deceleration,” says Rudiger, “I hope they’re made out of jello.”

“That’s for sure. Watch for the ping-back, Rudi.”

“On it.”

Commander Bolt addresses the crew. “All right, folks. We have about an hour. Let’s take our supplements...” and with a quick glance at Chen, “if we can keep them down. Get squared away. I don’t know what the hell we’re going to have to do when they get here, but whatever it is, we probably haven’t trained for it.”

Yarrow cannot help herself. “The GSA never met a flight plan they couldn’t try to improvise better.”

Bolt shoots back at her with a wink, “That’s why I only fly with the best.” This makes him think about Eesa, though, and a pang of sadness washes over him.

Johnny Bang pushes off and floats toward the gangway at the center of the cabin's rear wall. "Anyone else hungry?"

Yarrow moves to follow him. "Starving. I haven't eaten a damn thing in seven years."

Chen perks up. "I could eat." She pushes up from her seat cautiously, confirming the absence of nausea, and then floats after them with a two-footed push off the bulkhead.

Bolt calls after them. "I want everyone suited up and ready in forty five."

Yarrow calls back from the gangway. "Aye aye, Skipper."

Suco looks from Bolt to Elias thoughtfully. "Are we going to radio back? His family. I could..."

"I'll do it," Bolt interrupts. "After the rendezvous, when we know what's going on."

She acquiesces. "Ok."

"Ping-back, Skipper," says Rudiger from the controls.

Bolt acknowledges with a "Copy," and then looks back to Suco. "Thanks, Tana."

The psychologist nods to him and moves to follow the others out of the cabin.

Elias proffers her coffee cup in Bolt's direction. "It's not tea, but..."

He smiles his assent. She clips the spout closed and sends the cup floating in his direction. Bolt does not mind a little coffee now and again, but at this moment, the beverage choice could not be less important. They are not where they are supposed to be. The mission has been changed, and they are about to engage in an unrehearsed docking maneuver. This whole affair is disconcerting, and there had better be a damn good reason for it.

## CHAPTER 04: *Tether*

All seven crew members of the *Centaurian I* are in their spacesuits, but without their helmets on. Commander Bolt and Jeffrey Rudiger are at the cockpit control panels, watching the monitors intently as they depict the approaching *Centaurian II* spacecraft.

Rudiger narrates what he is seeing as if trying to understand why it looks so normal. “So they flashed up on us from behind, matched velocity, and now they’re moving in with thrusters...”

Bolt looks at him. “Yeah. What were you expecting?”

Rudiger shrugs. The other crew members are taking turns looking through the port-side windows as the ship makes its final docking approach.

Johnny Bang shakes his head. “I’ve got a bad feeling about this. One shimmy at this speed...”

Allie Yarrow keeps her eyes on the ship. “I’m sure... *pretty* sure they know what they’re doing.”

Although the Global Space Administration represents an historic collaboration between the nations of the world, one which sees a far more efficient use of global resources, it is still a bureaucracy. This means that GSA decisions, protocols, and timelines can sometimes make you want to pull your hair out. Despite that, Yarrow believes they still hold to the tradition of testing systems thoroughly before manned spaceflight is allowed to take them to the operational level. Not to mention that there is a crew on the other ship, and Rymer is a very good pilot. One would assume they do not have a death wish, and that they tested this new propulsion technology and practiced docking with it while she and her crew were all in hibernation.

Chen moves to look through the window beside Bang. “It looks like the Centaurian.”

Bang nods. “Yeah. Also an Alpha Class. The engine housing is bigger though, and there’s a bunch of... I’m not sure what those are for. Not antennas, right?”

Rudiger floats over to the window to investigate. “Not sure. A bit small to be antennae. Sharp points probably mean something electrostatic.”

They hear a slight scrape as a docking collar meets the side of the ship. Several indicators on the monitor flash green as the ships seem to lock together. The crew hold their breath. A moment passes. The radio comes to life again.

*Docking complete. Stand by for collar press. Collar press confirmed. Centaurian One, stand by for boarding.*

Bolt feels himself relax slightly. Is he imagining it or does the ship somehow feel more solid now, more stable? He replies, “Copy that, Centaurian Two.” He looks at his crew mates. “Ok. Let’s cut this ribbon and open the shop.”

Bolt floats towards the port airlock. It lies in the left rear corner of the main cabin, making it roughly half way along the port side of the ship. Yarrow and Rudiger follow, and then the others.

At the airlock door, Bolt peers through the window to verify that the two astronauts have secured the outer door. He checks the airlock pressurization, manipulates the large latch, and the airlock door slides open. They make room for the two newcomers, who begin removing their helmets, and Bolt closes the airlock door behind them.

Amaranth Rymer, 46 year-old African American captain of the *Centaurian II*, grins at Bolt, helmet in hand. “Never thought I was gonna see your sorry ass again ’til I was like a hundred years old with my teeth in a jar.”

“Glad you didn’t have to wait that long.” Bolt bumps his bulky spacesuit up against hers by way of attempting a hug. “Great to see you, Amma.”

“You too, Aksel.”

In spite of the confidence that Rymer seems so naturally to exude, she is nevertheless hiding her relief that the docking had gone smoothly. Even though they had practiced the maneuver with another Alpha Class ship, it is still not so clear in her mind what happens when your ship's field capsule encloses another ship incompletely. Hopefully, nothing. *But, damn, it's great to see them all.*

She introduces her companion, the 31 year-old Indian physicist and nano engineer. "This is Doctor Allowal Bhalla. It's his fault we're doing all this. The drive technology's his baby. He'll take you through it later."

Bolt extends his hand. "Pleasure. Welcome aboard, Doctor Bhalla."

Bhalla seems a little star-struck to meet the crew. "It's an honor, Commander."

Rymer gestures back towards her ship. "Two others still on board. You'll meet them in a bit."

Bolt turns to introduce his crew. "Captain Amma Rymer, let me introduce..."

Rymer interrupts. "Are you kidding? We know who they are. You guys are legends. First humans to cross the big void." She moves to shake Rudiger's hand as she identifies him. "Jeffrey Rudiger."

Bhalla follows, shaking Rudiger's hand.

Rymer approaches Yarrow and looks at her old rival with the faintest hint of a smirk, as if to say 'I caught you in my faster ship,' but she only says, "Allie Yarrow."

Yarrow shakes her hand. "Amma Rymer."

Yarrow and Rymer had graduated together from the prestigious Euro-NATO Joint Jet Pilot Training Program, or 'Enjept' as they called it. Although the Water Wars had ended just over seven years before they got there, the world's nations had not been quite ready to lay down their combat readiness completely. There were still air forces, and they still trained pilots, but it was mostly for the piloting of remote aerial assault vehicles (RAAVs), or 'attack drones' as the media had come to call them. The elite pilot

candidates — like Allie Yarrow and Amma Rymer — still got to train on traditional jet fighters, but only for a small portion of their time. In those early days of the WSSA's fledgeling peace, military leaders believed that 'readiness' meant their top pilots maintained those basic levels of skill and experience. There had been no manned fighter combat since the Water Wars, though, and even at elite programs like Enjept, real after-burner turn-up-the-Gs flying time seemed to be diminishing from year to year, for those lucky enough to even get *any*.

For the rest, the majority of candidates who only got to fly RAAVs, this policy was a source of great disappointment, and it was the reason that the pilots all yearned to join the space program. In an environment of solar system expansion, it was *there* that they seemed to have the greatest chance of doing some real piloting, and in a real craft.

Enjept had always attracted the best and the brightest, and Allie Yarrow had taken that as a personal challenge to excel *there* in particular. And she had. So much so, that when her class received their wings and 'Drop Night' assignments were given out — the most exciting and anticipated stage of a fighter pilot's training and entire path to that point, when they find out where they will be posted for the rest of their air force flight career... Yarrow was selected to stay on as an instructor for two more years. That *really* pissed her off! Technically, it is quite an honor, not to mention a big compliment, but she had a hard time seeing it that way. She was being forced to stay, to watch, as classmates she knew she could fly circles around moved on. They could head out into proper assignments and do the real, exciting work, especially those who were going straight into the space program.

As a consequence, Amma Rymer had advanced ahead of Allie Yarrow into the world of space travel, that playground in which both women so badly wanted to express their potential, not to mention *compete*. It had not been that Yarrow thought she was not going to get there also. She had just been upset by what she saw as an unnecessary delay. Plenty of other pilots could teach flying and tactics, damn it. Did they have to waste *her* on it?

Yarrow has always been acutely aware of Rymer's professional progress, at least, until entering hibernation in 2068. It is not that she thinks Rymer is not a great pilot or astronaut. She just believes that *she* is *better*.

"You look... a little older," says Yarrow, continuing to shake Rymer's hand.

"Nothing a little tequila can't fix. You can share it with us pilots when we get there," Rymer hits back.

"Then welcome the hell aboard, Captain."

Rymer ponders, teasing, "Yarrow. That's like a weed, right?" She floats past Yarrow by playfully pushing her in the opposite direction while muttering "Newton's third" just under her breath.

Yarrow replies just under hers, "Fly circles around you, Honey."

Rymer approaches the others. "Doctor Elias. I'm a big fan of your work on epigenetic feedback."

Jo-Leigh Elias shakes her hand. "Thank you, Captain."

"No problem. You'll be happy to know they've been taking your work further. We brought you some of the research papers."

"That's very thoughtful, thank you."

As Rymer continues past her, Elias turns back to the approaching young Indian physicist. "Doctor Bhalla. Sorry, what is your first name?"

"Allowal. But people just call me Allo."

*So refreshing not to be known*, he thinks to himself, especially after the craziness of the past few years since the development of his photonic propulsion system. He was just a theoretical physics PhD from Glasgow University, named after a small village in Punjab, India, where his grandmother had been born. She had been so poor that she had felt compelled to give his father away because she could not afford to give him the education that his brain so clearly cried out for. Granted, Allo Bhalla had done some pretty cool work after Glasgow in nano engineering, or atomic printing as he likes to call it, but after he developed the photonic drive, the spotlight definitely got a bit brighter than he

was comfortable with. He wonders how celebrities manage it all the time? It gets old really quickly.

Amma Rymer extends her hand to the others. “Doctor Lucinda Chen, gonna see if that rock can grow stuff for us, and of course, the indefatigable Johnny Bang. I feel safer already.”

Bang smiles, which is really only an almost-smile, as he shakes her hand. “Good to see you again, Captain.”

Bang had worked security at the GSA headquarters in Houston for several years before being accepted into the astronaut training program in 2053, the same year as Rymer. She had gotten to know him rather well during that first year of training in particular, and the more she had learned, the more she had both liked and respected him. He was not just one of those tough guys who liked to fight. As a child in South Korea, Johnny Bang had experienced the fall of the North Korean Kim regime in 2034, followed by the chaotic reunification process that was far more a humanitarian crisis than a political transition. He was a bit young to do too much at the age of nine, but by eleven he was finding ways to get to refugee centers, and he was helping especially the older people with their health and nutrition programs. What he saw, but more so, what he *heard* of what the people had endured made a deep and lasting impression on his sensitive and empathetic soul. It is no surprise to Rymer that he had become cynical and suspicious of people as a result, but it always seemed out of place in a man with a heart like his.

Rymer had been amazed at how philosophically he had approached it. He was no longer naive about people’s capacity to hurt others and act selfishly, but he was equally aware, in himself, of a great capacity for love and giving and helping. He somehow managed to graft what he saw within himself back into his view of humanity, and it managed to hold the darkness at bay. This was a very good thing because Rymer knows how easily a boy like him could have become a mercenary, a gangster, or something else that would have brought shame to both his family and his own soul.

After training, the two had followed very different tracks within the space program, but their paths had just converged once

again, and Rymer could not be happier about it. She moves to the next member of the crew.

“And Doctor Chantana Suco,” continues Rymer, shaking Suco’s hand. “I knew your father when he was at the WSSA. He was a brilliant man. I’m sorry for your loss.”

“I appreciate it.” Suco is touched by the sentiment, but she finds herself analyzing Rymer’s demeanor for any hint of sarcasm. Her father, Ambassador Narong Suco, had indeed been a brilliant man, respected not just in the Bangkok community, but also within the wider World Sovereign States Alliance political establishment, where he served on behalf of the Thai government. In spite of that, there were enough people who had looked askance at him for his support of SETI, the Search for Extra-Terrestrial Intelligence, at the Carl Sagan Institute at Cornell University.

Tana Suco is no stranger to the work herself, but she does not like to be as public about her passion as her father had been. There are too many skeptics throughout the scientific and diplomatic communities that it is not worth the career risk. In her mind, though, the logic seems undeniable. A universe this large — infinitely large for all we know — could not be home to only one intelligent species. Evidence in support of extraterrestrial intelligence is not simply circumstantial, either. Not anymore. Governments have been going back and forth, revealing and not revealing, admitting and denying, for more than a century. There have been enough people with impressive credentials who have claimed either direct evidence or direct contact — trustworthy public servants, distinguished scientists, military officers, and even ordinary civilians. She had met some of them, and she believed at least a few of their accounts. She is a psychologist, after all, and she likes to think she is a good enough judge of people that she can distinguish between the passionate and the delusional. She has been around both kinds.

In assessing her crew mates, Suco senses that, while Allie Yarrow may be skeptical about SETI’s work, she is a gifted astronomer and a true scientist who trusts data more than opinion. She will not allow controversy to contaminate her observations.

Suco is relying on that to turn her into an ally if they actually find anything — or *anyone* — out there.

But Amma Rymer's expression shows no hint of derision towards her late father, no signs of deception, only admiration. *Is she a possible ally also*, Suco wonders. How welcome that would be, and how useful. But even if not, she likes the new captain.

Rudiger looks through the airlock window in the direction of the other ship. "How stable is this docking connection?"

Captain Rymer transitions back to business mode. "Don't worry. The field capsule from our drive extends out about twice the distance of the docking collar, so it locks in with the inertia of your ship pretty good. Allo — Doctor Bhalla — will catch you up on the science. Been some developments since you left. We have a lot to talk about."

"Evidently." Bolt invites them to spread out into the main cabin. "Let's get started."

Rymer looks around expectantly. "Hey, where's Eesa?"

The moment that lingers in hesitation answers her question even before Bolt volunteers more detail. "His hibernation pod malfunctioned. He didn't make it past the burn."

Rymer is saddened. She places a hand on Bolt's shoulder. "Oh, Aksel, I'm so sorry to hear that."

Rymer had always liked Eesa Yussef. He was a considerate person and a top notch engineer, one of the best. She is confident that her crew still has the engineering bases covered for the mission, and Rudiger will be an excellent addition to that team, but even more so would Eesa have been. He did not deserve to go that way — unaware, deprived of an historic experience toward which his whole life had been prelude.

"I'm very sorry, Commander," adds Allo Bhalla. "I was looking forward to working with him."

"You and me both." After a contemplative moment, Bolt focuses his attention back on Rymer. "Alright. Let's have it, then."

She begins. "Ok. Long story short, we now have photonic propulsion, which gets us up to point ninety nine eighty eight C.

We're here to pick you guys up. We're ditching the Centaurian One, and we should make Prox b in just under two months."

A moment, as this news sinks in. Had she really just said 99.88% of the speed of light? A mind-boggling velocity.

Jeffrey Rudiger reacts first. "Holy fuck."

"You said it." Rymer lets them process for a moment longer.

Rudiger repeats his incredulity. "Over 99% of light speed?"

Rymer nods.

Yarrow jumps in. "When did you leave the system?"

"Nineteen days ago. For us."

"Nineteen days?!" gasps Rudiger.

Neither can Yarrow restrain her amazement, "You did in less than three *weeks* what it took us seven years to do? Jesus Christ."

The physicist in Allo Bhalla feels there is even more amazing detail to share. "If we could actually ever travel *at* the speed of light, which we won't, but if we could... then from our perspective, the trip would be instantaneous. Not for an outside observer, of course, but relativistically, a photon of light experiences its own emission and absorption events simultaneously."

"That's incredible," says Jo-Leigh Elias.

"Yeah, it really is." Bhalla is happy to have a fellow appreciator of the wonders of physics.

But Elias is focused on a different thought entirely. She is just realizing that there is an unexpected and completely welcome ramification of this new turn of events.

When she had said goodbye to her parents before launch, she had known it was almost certainly forever. That was hard, but interstellar travel was going to subject people to hard choices like that. Her parents may not have wanted her to go, for selfish reasons, but they also knew, as parents, that their job was to shoot the arrow that is their child into the world for her to follow her own path, and then to become a bow of her own making. Holding children back invites stagnation. Pushing them forward gives them opportunities for life, for expansion. This style of 'empowerment

parenting' had become popular during the early 2040s, most especially after the war ended in '41. Vicarious parenting, holding a child to conform, is a manifestation of emotional group-think, not reason. A wise parent who wants what's best for their child's happiness does what the Elias's did. They were willing to be deprived of their daughter in exchange for her chance to become her greatest self.

But now, she may be seeing her parents again after all. Well, that is assuming they survive the nine years that will pass on Earth following the *Centaurian II*'s 2075 launch. She could now get back only sixteen of their years after her 2068 launch, rather than six decades.

Johnny Bang, on the other hand, just shakes his head. "So we just slept seven years away for no reason? Superb."

Rymer had always found his dry, cynical affect refreshing. "Well, luckily now you don't have to sleep away another four decades to get back home, Johnny Bang."

He glances at the others, shaking his head, and then back to Rymer. "You guys don't have to use my full name all the damn time."

Rymer cannot completely stifle her grin. "You better believe that we do, baby," as she turns her attention back to the others. "We hit Prox b in a couple months and, depending on how it goes there, on how long we stay, we could conceivably be home in a few months."

Cindy Chen seems somewhat shaken by this news. "A few months?"

"Roughly," adds Rymer, "depending on how long we stay."

Chen tries to disguise her concern, but Suco has noticed. The psychologist cannot help wondering what that reaction might be about. Cindy Chen is the crew member she has known for the shortest time because she joined them on Mars late, pre-mission. She has always seemed so academic and cerebral to Suco, and outside of that, somewhat restrained socially. That is not atypical for genius-level experimental scientists, who often prefer the isolation of their labs and work to social interaction, but now she

finds herself rethinking Chen's demeanor. Has it also been masking something?

"So we're ditching her?" Johnny Bang seems less fazed by the developments. He taps the bulkhead. "Always suspected she might be a piece of junk. Version one. Your boat sleeps twelve?"

Rymer nods. "Yup."

Rudiger continues his line of questioning. "So it turns out we will only have been gone for just over seven years. I mean... for just over nine years on Earth. Big difference from fifty eight."

Elias looks at him happily. "That changes... so much."

Chen does her best to mask the fact that she is asking out of concern: "Can we send a message home?"

More fuel is added to Suco's curiosity. Could Chen be afraid? Of what? She is one of the heroes of the solar system now, let alone of her native China. Everyone knows her. Or is that the problem? Is she trying to be inconspicuous? Tana Suco is pretty sure her mind is not going to let go of the handle until this mystery door is opened.

"You can send..." Rymer answers, "but it'll take a year for it to reach them. We may have gotten here in nineteen days, but on Earth they just saw it take us about a year. We could be back after six months, and as far as they're concerned, we will have been gone for eight and a half years."

Doctor Elias redirects: "You have enough pods for us all?"

"We have them," Rymer clarifies, "but we shouldn't need to use them."

Allie Yarrow grins. "Now that's the best news I've heard today."

"I mean, unless a couple months on the ship is gonna drive anyone up the wall, then we can put you under, as a mercy to the rest of us." Rymer grins and then continues her report. "The mission hasn't changed much. We need to transfer your supplies and equipment over to the Centaurian Two. If conditions are good, we are still a go for surface recon. We're going to see what we can see, learn what we can learn, and head home. We don't have to make a whole production out of it now. We can always come back."

Yarrow adds. “Way to go, Bhalla.”

Allo Bhalla smiles. “Thanks. Very exciting possibilities.”

He had never expected he would find himself out here, between the stars. He had always been interested in the cosmos, of course. What sciencey kid isn’t? But he relates to himself mostly as a theoretical physicist. It was not that he had tried to build a technology for space travel either, but when he extended the theory of sub-quantum mechanics to what he saw as its logical conclusion, the implications were unavoidable. If a ship could really be placed inside of a spiraling electromagnetic field capsule, and if that capsule had the same interactions as actual photons — the tiny bullets of light energy — have with the fabric of spacetime... would such a ship be able to slip through space like a photon? Would human space travel be able to approach the speed of light? Were inertial bubbles truly possible so that we could withstand very sudden and very high G-forces? If they were, the course of human history would be forever changed, and that was an exciting prospect, especially if his work could play a role. Such a contribution he had never dared dream for himself, although secretly, he has always believed himself capable of it. *Physics must indeed be the greatest scientific discipline of them all.*

Yarrow asks, “So who’s in charge now, Captains?”

Rymer speaks first. “Commander Bolt is still mission commander.”

Bolt hastens to add, pointing, “And that is still Captain Rymer’s boat.”

“Ok, we’ll see how that goes,” smirks Yarrow.

Bolt chooses to ignore that quip and returns the focus to Rymer. “How much time do we have to move everything over?”

“No particular rush,” she answers, “but the less time we spend with the ships tethered, the better.”

This piques Rudiger’s attention. “Thought you said it was stable.”

“It is, they keep telling me.” She glances at Bhalla.

On cue, Bhalla explains, “Yes. We’re creating a field resonance as well as a physical linkage. Inertial bubbles interact

with mass in a very interesting way, it turns out. It's not quite a gravitational Faraday cage, but..."

Amma Rymer jumps back in. "But my belly thinks untethered is just safer and I'll be happier when we're done here."

Bolt glances at Yarrow. Of the crew members, the two of them know Rymer the best, and they have also both flight tested propulsion systems. While Bhalla's explanation may seem plausible, they can tell that Rymer harbors concerns. And now they do as well.

## CHAPTER 05:

### *The Bubble*

In the medical quarters of the *Centaurian I*, the hibernation pod containing the body of Eesa Yusef is now covered with an opaque white plastic sheath. Doctor Jo-Leigh Elias tries to keep her back to it as she gathers containers of supplies for transfer to their new ship, but she cannot help being constantly aware of its haunting presence behind her. She welcomes the distraction of one of her newly-arrived crew mates, the 33 year-old Kenyan geologist, Dr. Kioni Kihumba.

Elias smiles at her. “Thanks for helping.”

“It’s my pleasure.” Kihumba looks at Elias with admiration. “You know, I’ve been the acting mission medic, well, officially only since we left two or three weeks ago.”

“What’s your training?”

“I’m just an EMT, and I did the training some time ago. My mother was a nurse and she thought it would be a useful skill, which it is, of course.” She pushes a box towards the door and it floats that way gently, bumping up against the frame and bouncing slowly back in their direction. “But I’m glad we have a real doctor now. And that it isn’t me.”

Elias finds her very easy to like. Kioni Kihumba has an energy and enthusiasm that might cause some to mistake her for a younger woman than she is... although she is one of the youngest people on the mission. Maybe that is part of it. But if she is here, it is almost certainly unequivocal proof that she is one of the most gifted people in the solar system in her two fields. Most missions are crewed up by people with at least two areas of specialty. This is the GSA’s way of ensuring they get the greatest number of important skill sets into the smallest payload. Or onto the smallest payroll. It does not take a rocket scientist to know that any

meaningful assessment of an Earth-like planet in a star's habitable zone has to include a comprehensive analysis of both its geology and its climate. Kihumba has done both kinds, on Earth and on Titan. That is impressive, given her age. She must not only be good, but also lucky, thinks Elias, because that was some damn efficient rung climbing. Now this charismatic young Kenyan is going to be one of the first humans to set foot on an exoplanet. If not *the* first, in her role as the mission geologist. The fact that Kihumba is destined for the history books must not have sunk in yet, or if it has, she definitely does not show it.

“Your mum worked as a nurse?” asks Elias. Kihumba nods, and Elias prompts, “Where?”

“In Kenya.”

“Oh that must have been...” Elias realizes — the aftermath of the war had not been easy, particularly near the battlefields that had been hit by tactical nuclear strikes. Two of them had been in the south east of Sudan, just on the other side of South Sudan from the northern border of Kenya. The radiation in the vicinity had affected many soldiers, and some civilians also, and most of the hospitals across the northeast African region were pretty busy after the war.

“Yes. Lots of radiation sickness.”

Elias decides it might be more polite to change the subject. “Kioni's a pretty name.”

“Thanks. It means ‘the one who sees and finds things.’ So hopefully we'll get lucky on Prox b and we'll find some cool things.”

“I don't doubt you will.”

“You know, I was twenty six when your mission left, and I was so jealous of you all. It's hard to wrap my head around the fact that I am on *that* same mission with you now. It's, like, impossible!”

Elias smiles at her. “Yeah. It's wild.”

At the *Centaurian II's* cockpit controls, Elli Ohr, the 36 year-old systems engineer and pilot, is amused to find he can still pick up broadcast signals from the solar system.

“Hey...”

He looks around and is somewhat disappointed to find that no one else is in the cabin with him, and he turns his attention back to the console. With his fingertip electrodes making contact on the control panel, Ohr interfaces with the system by way of his built-in bio-electronics. The Israeli systems engineer's genetic hybridization is not only for calculations, like Rudiger's, but also allows him to store energy and discharge electronic signals. After two years of begging, he had finally convinced his parents to allow him to get them after high school, and once he had been accepted to study at the prestigious *Technion* in Haifa. He had argued that all the other kids would have them, and that as a systems engineering student, he would be at a disadvantage without them. It had not been a lie, of course. They are an indispensable tool, and Ohr uses them now to fine-tune the reception of this transmission from Earth.

Johnny Bang floats in shepherding two atmospheric scrubbers and a tool box on their zero-G journey into the new ship. "Engineering in the same place?" he asks, pointing aft.

Glad to have someone to tell, Ohr answers him absently so he can get on with the story. "Yeah. Hey, I'm getting a faint signal. News, it sounds like. It would be from last year, right?"

"We were asleep for that."

"That's why I'm saying."

Bang gestures towards the gangway at the back of the cabin. "So, same place? Engineering?"

Ohr is slightly deflated by his new crew mate's lack of interest in the news. "Yeah. You'll see the difference. It's a bit bigger on the... but it's all... Those go in the same place, yeah."

Bang looks at him for a moment, communicating without saying it that Ohr had not been particularly efficient in his communicating, and that efforts towards improving efficiency would be appreciated in all future communications. An audio signal playing at a low volume is coming from the control panel beside Ohr. It is enticing his attention back, despite his realizing that it might be impolite to look away from Bang too quickly.

With an “Ok,” Bang continues tapping his floating cargo on towards engineering, and disappears down the rear passage with it. Problem solved.

Turning his attention back to the controls, Ohr touches the monitor and a holographic video news report crackles open, volume up to normal. It is an Orion News Network report from 2074. The signal is slightly redshifted as a result of their high travel speed, which lowers the pitch of the dialogue and slows it down slightly. It is not completely clear either. It had been traveling through space for a long time, and although that space seems mostly empty, it is not completely free of particles or radiation. The interference and scattering caused by both tends to smudge radio signals a little as they pass. After traveling a great enough distance, normal broadcasts eventually lose their ability to stand out over that background of radio noise. At times, both the image and the sound in this transmission morph into patches of fuzzy noise, but then usually return to decipherable clarity before too much of the story has been missed. Let’s face it, Ohr thinks, if we’re being honest, the news report genre has basically been stuck in the same stylistic rut for about a century. Just give me the headlines and I can probably fill in the details.

On the monitor: ... *confirmed that the refuge is down to its last pair of tigers... (crackling)... has allowed for the genetic preservation of creatures that would, in the past, surely have gone extinct... (crackling)... if we could now reconstitute their habitats, we could... (crackling)... though, still remains contentious, as our other top story demonstrates. The trial of ... (crackling)... for the defendants have asserted that ... (crackling)...*

Jo-Leigh Elias and Kioni Kihumba float in from the airlock at either end of a row of medical supply containers hooked together into a train.

... *(crackling)... for a bio-electronic hybrid human android, has not yet been fixed by the legislature... (crackling)... personhood. For some, this means, in a phrase, that ‘androids don’t have a soul.’ Public sentiment has ... (crackling)...*

Kihumba recognizes the report and protests to Ohr. “This? Seriously? Isn’t there anything else on?”

“No. It’s cool that we’re picking up anything. Anyway, it’s new for them. It’s from last year. They were in hibernation.” Ohr tries Elias. “Doctor Jo-Leigh? It’s from a year ago.”

Elias is somewhat distracted by another concern, though. “Shouldn’t we be doing all of this with a bit more urgency?”

“Well,” Ohr shrugs, lowering the report volume somewhat. “It’s not really an issue for travel time...”

“For safety,” she clarifies.

He shrugs again. “Well, we’re all connected, same trajectory, so if anything comes by big enough to knock us apart, we’re all gonna be a cloud of space dust anyway. Poof. It’s probably better not to think about it. Mainly because it’s extremely unlikely. I mean, it’s just as unlikely as something hitting your ship while you were in hibernation. Same outcome.”

“The regular cost of doing business in deep space,” she confirms.

He nods. “So you feel better about it?”

“No. Not really.”

Commander Bolt and Allie Yarrow float in through the airlock, followed by the now-chatty Allo Bhalla, together shepherding an assortment of floating supplies. Elias and Kihumba maneuver their container train to get out of the way, and head through the gangway at the back of the cabin leading to the *Centaurian II*’s medical quarters.

Yarrow reminds Elias. “Jo-Leigh, the coffee stuff.”

“Yes, and the tea,” she calls back, smiling. “Step ahead of you.”

Bhalla resumes what he has been explaining to Bolt and Yarrow. “Anyway, it’s always easy to say in hindsight, I suppose, but it amazes me how long it took people to realize that gravity was just an effect of electromagnetism. The fact that it’s only attractive is what must have thrown them off because electro and magnetic can both be attractive or repulsive. Seems so obvious now though, right?”

The two look at each other, not sure it is obvious to either of them, although they are understandably a bit distracted at the moment. As an astronomer, Yarrow is, of course, quite interested in the nature of gravity... but just not right now. Not during all of this. Bolt, on the other hand, feels more like he might only ask Allo to explain it to him again during one of those really long and slow 'space travel' days. And on the way back. Maybe.

Ohr tries his luck with the newcomers. "Commander..." He raises the volume again on the broadcast signal. "Picking up some news transmissions from last year. Not great reception though..."

*... successful test of the photonic drive technol... (crackling)  
...ty nine point eight eight percent of the speed of light means that now  
... (crackling)...*

Bolt and Yarrow both seem to find this distinctly more interesting than Bhalla's exegesis on gravity. Ohr can now at least feel vindicated by their attention, even as he watches the disinterested Johnny Bang float back into the cabin, through it, and back towards the airlock.

*... octor Allowal Bhalla admitted, even though there were complications in the earliest stages of development, he had no doubt that this particular test was going to... (crackling)...*

Ohr calls to Bhalla. "Allo. Remember this?"

Bhalla's torso appears on the partially distorted video feed, being interviewed, the pitch of his voice slightly lowered by the redshift: *... (crackling)...* *have to admit that it has been a privilege to work on something so... (crackling)...*

Bhalla smiles shyly and turns back to the floating containers of supplies. "I'll just stow these."

He ushers them towards a storage compartment along the bulkhead. He had never been a fan of all the attention. He understands why Neil Armstrong had become a virtual recluse after the Apollo 11 mission in 1969. He had landed a role of enormous historical significance — the first human to set foot on another heavenly body. He achieved it simply by pursuing his great passion for flying, and doing it with excellence. Becoming an international

hero as a result, an idol, an object of adulation for the masses, must have made him feel like a big fraud. He was just a pilot at heart! Bhalla feels he can relate.

Did unleashing photonic propulsion put him right up there, in the company of the likes of Maxwell, Einstein, Dirac, Williamson, Robinson? Certainly not equal footing with *them*, he chides himself. That is probably a stretch, although there is no question that his innovations have accelerated the path of human exploration. That is not a small thing, but he had been standing on the shoulders of giants. Maybe the media had been short of things to report on. Or maybe he is better looking than he thought, he jokes with himself. It had not taken long for him to start looking for creative ways, and sometimes just downright antisocial ways, of avoiding the media's advances.

He is just a guy who loves physics, and mathematics too, obviously. Hard to do one well without a solid knowledge of the other, even though the mathematics has to serve the physics and not the other way around. Many have gotten that order of operations reversed over the years — doing complex mathematics and then declaring that its results must exist in the universe because the math said so. In his opinion, it held back the development of science by decades, if not a century, in several cases. Not to mention that it violates the integrity of the beautiful and perfect scientific method, simply by rearranging the order of its elements. It is a violation so subtle that most of its perpetrators are not aware they are even doing it, and will deny and resent the accusation if it is leveled at them. Ironically, the problem is made worse by the fact that, occasionally, the mathematics does indeed lead us to a new and correct discovery — like antimatter, for example.

Even though this Proxima Centauri trip is only going to be for a few months, Bhalla relishes the idea of getting away from the entire solar system, from everywhere within broadcast range of the Orion News Network. It feels like a way of cleansing himself, as if the forces of attention themselves would fade with increasing distance from home. Space would be his *snanam* — his *mikveh*, his Baptism of energetic degaussing.

Yet, here it is — a transmission stalking him still, even roping Elli Ohr in to do its nefarious bidding. The redshift only makes it worse, drawing every excruciating sentence out that tiny little bit longer. At least the interference is increasing and the signal weakening with distance. It should not be too long now, he thinks. It will no doubt be nice and quiet by the time we get to Prox b, the offending transmission at that distance no louder — and indistinguishable from — the background radiation. What a lovely thought.

On the monitor, interviewed-Bhalla with the slightly deeper voice continues: ...*(crackling)*... *is no longer just the arena of the imagination. Now we can actually do it. We can go out into ... (crackling)*...

Allie Yarrow looks at Bolt. “Kind of weird, huh?”

The host of the report has returned to the monitor now. *Meanwhile ... (crackling) ... continue to deny that a version of the drive is being engineered on Ganymede. When asked for comment, Doctor Charles Cardinal insisted that ... (crackling) ...*

Bolt recognizes the name and directs his attention more closely to the monitor. “What was that?”

Ohr reassures him, “I’m recording the feed.”

*... (crackling) ... but then we have never received confirmation regarding any of those programs. Cardinal has also been an outspoken critic of the Search For Ex... (extended crackling) ...*

Allo Bhalla inquires, “You know him, Commander?”

“Yes. We go back.”

“To the old days,” Yarrow adds. “Commander Charlie ‘don’t-be-a-wuss’ Cardinal.” Bolt looks at her. “I can say it. I’m a woman.”

Captain Amma Rymer floats in with Jeffrey Rudiger from the direction of the engineering cabin. “How we doing?”

Ohr lowers the volume of the transmission as Bolt answers.

“Good, I think. Cindy might need some help in the lab, though.”

Rudiger says, “I think Johnny Bang said he was heading over.”

Rymer nods. “Let’s start wrapping this up.” She is becoming aware that her internal stress level is rising. They should not drag this affair out any longer than necessary.

The control panel *dings* a different sound. Ohr and Rymer both turn to look.

Yarrow pushes herself into a floating approach. “Was that spectro?”

Ohr nods. “Yeah.”

“What is it?” Rymer asks.

“I don’t know.”

Yarrow thinks out loud. “The spectrometers are real sensitive. Yours are probably even better than ours, right? It’s gonna track a lot of things.”

“All of a sudden it found something?” Ohr asks.

Johnny Bang enters with several small plants and a larger bag of synthetic soil. “Cindy’s just prepping a couple of the last fungal cultures, and then we should be good.”

A sudden vibration is both heard and felt, moderate in absolute magnitude, but not moderate in the effect it has on the crew.

The hairs on Rymer neck stand on end as if electrified. “What the hell was that?”

Rudiger pushes himself hurriedly to the control panel.

Ohr is already analyzing the monitor, suddenly serious. “Captain, it looks like something... fell off the Centaurian One.”

The crew look at each other apprehensively. Bang makes a beeline back towards the airlock.

Bolt calls after him, “Johnny...” but he does not stop. Bolt scans the room. “Is anyone else still over there?”

Rymer barks an order. “Helmets, people. Now.”

The ride feels stable once again, but that does not ease concern. Only half of the crew in the cabin have their helmets at hand. They start putting them on while the others push off in different directions in search of theirs.

Bolt’s brain fires into situation-assessment mode. Like any boat worth its salt, every model of the Alpha Class spacecraft,

which includes both *Centaurians*, features pressure doors that will immediately seal any compartment suffering sudden or drastic depressurization. A hull breach is not the only possible diagnosis here, Bolt realizes, but if something fell off the ship, it could well be. Either way, this is very bad. His ship is destabilizing, and the two ships are connected. If the piece that came off was part of the lab bulkhead, they may have just lost Cindy Chen!

And at any moment, they could all be next.