TOM SWIFT

And The

Reconstructed Planet

BY

Victor Appleton II

Made in The United States of America

A Special Word of Thanks

To author Joanne Larner, my British writing buddy. She who introduced me to a Richard III who is much more interesting than a pile of old bones found under a parking lot and gave him a romantic side he might actually have had in real life, even if the time traveling parts may be a bit fictitious. But, who am I to say anything; I deal with the fiction of science all the time!

THE NEW TOM SWIFT INVENTION SERIES

Tom Swift And The Reconstructed Planet

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There has been a tenth planetary object residing beyond the orbit of Pluto. It remained hidden until space-based telescopes detected all the tell-tale signs. But it remained unseen for years and years until Tom Swift decides to go take a look.

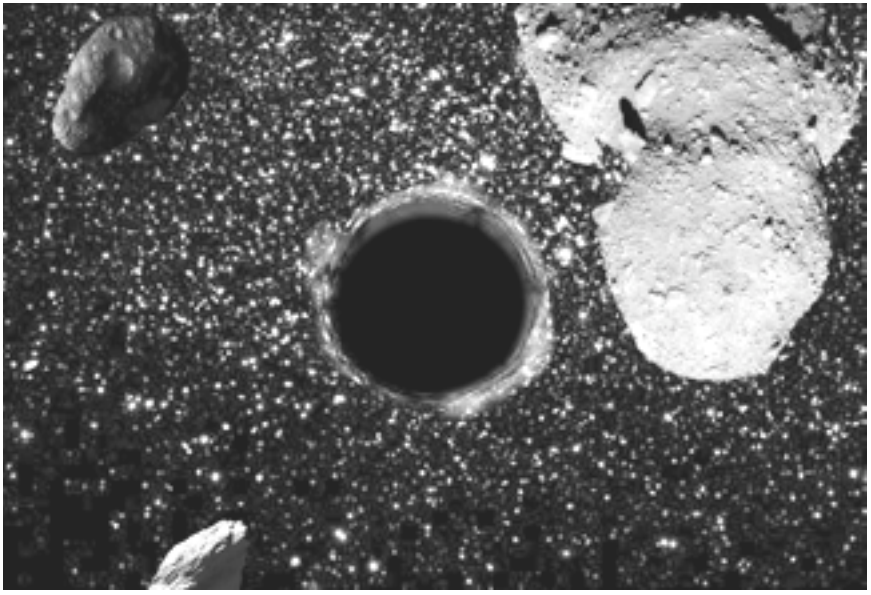
Known as Eris, it is larger than Pluto—about one-quarter the size of the Earth—and even has its own moon, but is so far away that it never gets closer to the sun than millions of miles farther out than the apogee of Pluto's orbital path.

When he and Bud and their crew arrive, it is to a distressing sight: Eris is attracting another solar object, and they soon find it is about to smash the planet apart.

Everything Tom tries only delays the inevitable, but he must succeed in saving Eris. If not he calculates that so much debris will be pulled toward the sun that it will slam into at least five other planets. With Mars a possible victim, it is vital to succeed.

Too late he watches as the planet is hit and begins to break up. What can be done to hold everything together? Even if he finds something, can Tom really rebuild an entire planet?

This book is dedicated to the team at the Palomar Observatory and Mike Brown, Chad Trujillo and David Rabinowitz who first discovered Eris in 2005. And the crazy part is that Eris isn't the only other new "planet" in our solar system. There's Sedna, a planet that takes 10,500 years to make one orbit of the sun. And, 2012 VP113, a tiny planet with a cryptic name. Why these are not *Jeopardy* or *Q.I.* questions can only be ascribed to ignorance or petty jealousy. Or, foolish indifference.



With very little event horizon, if Tom hadn't maneuvered the ship within thirty miles, the black hole wouldn't be visible against all the stars and debris surrounding it. **CHAPTER 8**

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AUTHOR'S NOTE

When I allowed myself to be convinced—and, it didn't take a lot, to be honest—to help resurrect Tom Swift, but using my own spin on things, little could I have known that six years later I would have completed fifteen solo novels plus another trio of dual-author novels, along with scores of short stories.

Now, as I begin novel sixteen and year seven I find my enthusiasm has not waned one iota. Of course now rather than having three or more waiting titles to get to I am getting out of my comfort zone. For now I am well into the realm of speculative science fiction with our fair-haired inventor, I have but two titles in mind at the moment.

With the previous novel dealing with time travel and this one having elements of faster-than-light travel I may be leaving behind my more ecologically-oriented stories, but I promise that whatever I write about Tom and Bud and all the rest of the folks from Enterprises, it will continue to be thoughtful and aimed at the widest possible audience.

I would love to say that these things write themselves. Really, I would. In fact, they kind of do. I "discover" a title plus a few words to set things off, but the characters tell the story to me. So much so that often what I start out to write gets left in the dust of what actually comes out through my fingers. This one turned out fine...

Copies of all of this author's works may be found at:

http://www.lulu.com/spotlight/tedwardfoxatyahoodotcom

My Tom Swift novels and collections are also available on Amazon in paperbound and Kindle editions. Barnes and Noble sells Nook ebook editions of these same works.

FOREWORD

A goodly number of people were bothered and even outright angry when a bunch of academics took their collected pipes out of their collected oral orifices long enough to declare that Pluto had been demoted. Count this author among them.

What sticks in my craw now is that Eris, the planet in this story, is supposedly about the right size to be given minor planet status, yet this same body of jer— *people* have done nothing toward that end.

Yes, yes, yes, I understand that as time goes on things change. Methods of measuring object 'out there' change and people's interpretation of what they are seeing out there change.

But let's all get together and push back on these people. Sauce for the goose and all that. Set a definite guide for planets, minor planetary objects and even moons. Surely some of the small asteroids trapped by the gravity fields of the larger planets aren't true moons?

Take our own Moon. It is technically a planet orbiting in our gravitation field and we in its making us a binary planet system all on our own! Did you know that?

If they were then all of the asteroidal debris that circles the Earth ought to be given individual moon names.

What about Cruithne? Is it a near Earth object or moon? The Trojan asteroids? The Moon of Georg Waltemath? Lilith?

I wish we could put a stake in the ground that includes Pluto as a real planet again and anything larger as well—as long as they orbit our sun.

Victor Appleton II

CHAPTER 1 /

HOW MANY?

"HEY, MR. SWIFT," a dark haired young man of about twenty-three called out as he came into the large office. He had found Damon Swift, world renown scientist and inventor, sitting at his desk on the far side of the room. The younger man, Bud Barclay, inclined his head toward another desk sitting closer to the door.

"Have you seen Tom? I tried TeleVoc-ing him about an hour ago and he said to come over about now."

"No, Bud. He hasn't been in this office all day. And, I can't say that I've heard any noises coming from his laboratory next door. Did you try the underground hangar office?"

Bud nodded. "Yep. And the cafeteria and the Barn. Loads of places." He noticed that the older man seemed to be stifling a grin. "So, no idea, huh?"

"Well, he mentioned something about a road test. I think he was planning to go out to our longest runway some time today. I'd check there if I were you."

"Thanks!" Bud called as he was heading out the door.

He stepped onto the moving ride/walk band down the middle of the corridor and jogged toward the far end of the building. Jumping off just before the end he took five big steps to the stairs and raced down them. He had left his red convertible in one of the closest parking spots so he jumped in and was racing off and around the building complex that sat in the middle of Swift Enterprises—the four-mile-square industrial and experimental facility—within seconds.

He took the access road that let him cross the two easternmost runways, past the small terminal for private aircraft and visitors, and then to the east end of runway 27.

To his great surprise a pair of beautiful young women stood there, one with a tablet computer and an old-fashioned stopwatch, and the other leaning over and speaking softly to her.

The first one—obviously timing some sort of event—was blond, blue-eyed and he was certain she would look incredible in a bikini. The other was dark haired, like himself, and had lovely light brown skin. She, too he considered, would be beautiful in a bikini.

Jarring him from his thoughts, the blond turned and stared at him. She handed the tablet and stopwatch to her companion and stepped forward, flinging herself into the air a few feet from him and landing against him in a tight hug.

"Bud!" she cried out, happily kissing his face several times. "Bashi and I thought you were on some test flight. So, how is my wonderful husband this fine morning?"

The other woman, Bashalli Prandit Swift—Tom's wife—turned and favored them both with a beautiful smile. "Hello, Bud. After you get Sandra to release you, come over and take a look at your brother-in-law. He'll be getting back here in about a minute."

The flyer accepted a last sloppy kiss from his wife, set her back on the ground, and the walked to Bashalli.

"Hey, Bash. So, what is our fair haired boy doing today? His dad wouldn't spill any beans."

Rather than answering she pointed down the length of the runway they stood next to. Something could be seen coming their way but the morning heat waves rising from the tarmac obscured it. Whatever it was appeared to be tall and thin. And, from the rate it approached, it was fast.

"It is something he saw on an old newsreel program on the Internet a few week ago and has been working on in the back of our garage ever since. Look."

Bud did and he saw what appeared to be a single, eight-foot-tall wheel race toward them, and then past.

Sandy's thumb clicked down on the stopwatch and she tapped a number into the tablet computer. "Golly! Better than the last run by eight seconds and now up over eighty-three miles per hour. Color me impressed."

Whatever the inventor was driving rapidly slowed down and turned around at the very end of the runway, and it was soon approaching the three young people at a leisurely pace.

When it arrived, Tom—sitting in a reclined seat in the lower, middle of the wheel—pressed a button and four thin stands shot down to the ground. He touched what appeared to be a combination control panel and windscreen, shutting the machine off before stepping out.

Sweeping his right arm around to the wheel, he asked, "Isn't it kind of incredible?"

Bud laughed. "Or at least impressive and surprising. So, I know I've seen something like that in an old book, but what the

heck is it?"

Tom pulled his helmet off and handed it to Sandy. She made a face and bent over setting it on the ground.

"It's a monocycle. Sort of a motorized unicycle except the driver sits inside and not on top of the wheel. Keeps the center of gravity low and makes it pretty stable. Well, that plus four gyroscopic balancing devices. I'll check you out on it and let you have a go in a few minutes."

As the young inventor walked a few steps to an ice chest and withdrew a wet and icy can of cola from it, Bud took a closer look at what was parked ten feet away. Sandy and Bashalli came with him.

It began with an air-filled rubber tire at least eight feet tall and just about six inches wide. There were no spokes so Bud figured the rim must be incredibly strong to support the vehicle and rider. It featured a shiny, offset track of some sort Bud believed the seat ran around on. He peered at the control panel. It had nothing showing because the power had been shut off, so he waited for Tom to activate it again.

When he did, Bud's face split into a big smile. Like most Swift vehicles, aircraft, submersibles and even the bullet train locomotives they made, the panel was simply a curved monitor on which the appropriate gauges and readouts appeared. This one was a sleek sixteen inches wide and just seven inches tall.

And, like other panels, if he touched one of the readouts until it wiggled slightly and then moved it using the same finger to another location, the readout that had been there swapped positions.

"Inside and behind the seat pedestal is a Y-2 engine," Tom said coming back to the group. He meant one of his revolutionary inverted Y engines that combined a trio of two-cylinder engines in a single crankcase. Working in unison meant there was almost no point where at least one cylinder wasn't firing, so constant power was provided. It even meant the end to heavy and power-usurping flywheels. "This one is a zero-point-three-liter combination with about forty-eight horse power."

Bud let out an appreciative whistle.

Bashalli, matter-of-factly, stated, "Tom has done an incredible thing, although I do not have a single idea what good it will be. Another toy, I suppose." She sighed. Inwardly, she was incredibly proud of her husband. He was a wonderful and thoughtful man and a great father to their young son, Bart.

He blushed. “Ah, Bash. It was just something to help me wind down from the stress of nearly losing you and the baby, and then the first week when neither of us got any sleep!”

Bashalli had given birth to their first baby, Barton Swift—named for the boy’s great, great grandfather—seven weeks earlier. It had been a miracle in Tom’s mind. Just two days before that event she had been hit by a car and the two of them killed.

Well, not exactly. In fact, once Tom used his Yesterday Machine—based on a time anomaly he discovered in another solar system and brought back to Earth for study—to go back and keep the full accident from occurring, she only got a good bump and a couple bruises.

Then, either the “real time” Tom or the time traveling one dissolved, painfully, into nothing but stray atoms leaving one of them to carry on.

Both mother and son were fine and the baby had come into the world at six pounds, six ounces and was as healthy a baby as the hospital staff had delivered.

Barton’s only problem was, like many babies, he was restless and refused to sleep much. He wasn’t fussy, so that was a blessing, but he was demanding of his parents’ time.

Bud was grinning as he kept walking all around the monocycle, touching the tire and the control panel and even patting the seat.

“I’ll take your enrapture with that as a silent request to be allowed to take it out for a spin,” Tom told him with a wink.

Bud looked around to the inventor, his best friend and brother-in-law. “May I, father?” he asked in a little boy’s voice.

Everyone laughed.

“Yes, little Budworth, you may. However,” Tom held up a warning finger, “first I need to go over a couple things and give you a few driving hints. And, no picking up girls!”

“And that, Bashi, is our cue to leave the little boys alone and go get some pastries in the dining hall. See you two later,” Sandy said handing the inventor the clipboard and stopwatch. “Don’t let my Bud get too hurt, Tom!”

“Too hurt, indeed!” Bud snorted. As one of Enterprises’ top test pilots he was by far the more cautious of the two of them. Sandy was a little impetuous. She was an exceptional pilot but sometimes let eagerness overrule caution.

As the wives drove away, Tom showed him the basic controls that consisted of a balance gauge—something like an aircraft's artificial horizon—and told him, "Under normal operation the wheel will want to stay upright, but when you go into a corner and lean, it will allow that. Never let it go more than fifteen degrees to either side. You stand a chance of hitting anything slightly loose or slippery and dumping it when tilting any farther over than that."

After a review of the other three readouts—speed, engine revs, and fuel—and showing Bud the operation of the joystick (where he cautioned, "If you pull back the wheel thinks you want to stop; keep it back and you go in reverse.") he declared Bud ready for a slow test run.

"Head straight down the runway about a mile and then slow it down to about three MPH. Then give it a bit of stick to turn around and come back."

Bud did that and performed his duties as driver to such a fine degree that Tom allowed him to spend the next hour driving it all up and down the runway and even in a slalom. Tom finally suggested that the flyer take it back to the Barn—an open-sided hangar near the Administration building—while he drove Bud's car back for a meeting later that morning with his father.

"Remember, flyboy, this isn't a race!"

* * * * *

Tom stopped off at the entrance to the underground hangar for his first major invention, the *Sky Queen*. Situated across the lower floor from the normal placement of the nose wheel were a trio of rooms: his small private office; his small lab and design studio where he went when he needed peace and quiet; and a single bedroom with bathroom where he used to spend late nights rather than drive home exhausted.

Ever since the pregnancy those nights had been curtailed to just two, and his wife had come to work at around midnight to stay with him on both occasions.

After taking the eight levels of stairs down, what he thought of as his only current exercise program, the young inventor crossed to his office.

He perused a report from the telescope project manager at the nearby Swift Observatory advising him that one part of the computer program that had been recently cobbled together was not providing the hoped for results. Tom made a few notes and called up the errant computer code.

In a matter of five minutes he spotted what would most likely be the problem. Another ten minutes and he had recoded that portion using a new subroutine to check and adjust focus to a database of standards every one hundredth of a second. Now their telescope should remain solidly in focus.

He uploaded the new code and sent the project team a note telling them where to find it and where to insert it into the existing code.

Next he brought up the monocycle plans. Bud might not have spotted it, but there was a small glitch between the engine and the drive system he had hand built. Fortunately, the issue was in a replaceable drive sprocket that he realized required one additional tooth in order to mesh as smoothly as possible with the outer rim. It could be easily built, like the original one, using the vacuu-form equipment in Hank Sterling's workshop.

That, basically a small version of the two large machines at the Construction Company, could build its own precision form, have multiple layers of flexible materials laid into it, get flooded with a fast curing liquid and then be trimmed and baked in an oven to set it as hard as steel. Some combinations of materials were even stronger.

He tapped his TeleVoc pin and silently connected with Hank. After saying he had a new part to make, the big Engineer and chief pattern maker for all things developed and built by the Swifts promised to have it in the machine within six hours.

"No hurry, Hank. Two or even three days will be fine. I won't have a chance to play with the cycle until then. Thanks!"

A light knock came on the doorframe leading to the hangar. Tom looked up to see Bud coming in, a smile still plastered across his face.

"Hey, skipper," he said taking a seat on a chair across the desk. "I just wanted to tell you about a little hitch in the git-along on that cycle. It's probably nothing but it feels like the gears don't quite mesh right. Have you noticed that?"

Tom laughed and told the flyer that he had just asked Hank for a replacement.

"Figures!" Bud said. "Well, I also had a question. Are you just making this for you, and hopefully me, to play with?"

Tom leaned back in his chair. "I'm not sure, Bud. At first it was just an engineering exercise for me. Then I had Hank build a few parts and found an off-the-shelf 3D design for the big wheel, and it sort of came together into something tangible." He

shrugged. “As for its future, I haven’t given it much thought.”

Bud had a grin on his face that told Tom he *had* been giving it a lot of thought during his ride.

“Do you recall those little airplane racers you made for the rich guy out in Las Vegas?”

Tom nodded.

“Well, I’ll bet there is someone out there who would love to have a couple dozen of these to race either around some track, or even out in the sandy desert. What do you think?” He had an expectant look on his face.

Tom shook his head. “Again, flyboy, haven’t given it any thought beyond using this one to kill the few minutes Bart didn’t need either mom or dad to pay full attention to him.” He stopped and considered something about this young son. “In a way, he seems to be a lot like Sandy. She was always crying and demanding mom and dad pay attention to her. Thankfully,” he added giving Bud a sly look, “she seems to have grown out of since marrying you!”

Bud looked right at his best friend.

“Want to bet?” That made them both smile.

He leaned over the desk to see what his friend had on the screen. While Bud had been settling in, the inventor had called up a floor plan of what looked like the Swift MotorCar Company, the newest manufacturing plant located just a couple miles to the south of Enterprises.

Tom began copying and pasting a large amount of the equipment that ran the length of the building on the north side into positions in the middle of the great hall.

“Did your dad and Charlie Van deGroot finally decide to put the second assembly line in place?”

“They did. I don’t know if you’ll recall, but before you and I went back to that odd solar system I told you we were months backlogged on orders for the first model we were making, and that we were going to build the second model later this year.”

“Yep! My brain can even remember a few days before that as well. Everything else is kinda hazy, though,” Bud said jokingly.

“Fine. Well, since then we have fallen another month behind in deliveries versus increasing orders for the small family coupe and now they are also building the sports coupe it’s starting to look like even putting on three shifts and building around the clock isn’t going to do much to help for a year or more. So,” he

pointed at the plan, "the build of this new line is going to get started over at the Construction Company next week. Jake Aturian has promised to expedite everything he's making so in about two months the first test car will come off line two."

"How about line three?"

"Truth be told, we are all hoping that won't be necessary. We're going to be running out of trained employees as it is, and neither dad nor I want to import lots people from other companies. They come with habits that Enterprises' people don't have and won't put up with."

Ten minutes later Bud departed and five minutes after that, Tom left the underground hangar as well, heading for the Administration building and his appointment.

"Ah, Son. Thanks for coming over," Damon said on looking up to see his son walking through the office door. "I had a call earlier this morning from the Swift Observatory. Dr. Jeffers wanted to let us know there has been a startling new discovery."

Tom smiled at the mention of the man and his official title. He could hardly believe that his friend and former Swift pilot, Bob Jeffers, had originally trained as an Astronomer, held a Doctorate in Astrophysics, and when a position had opened with the departure of one of the older members of the Swift Observatory team, he had jumped at the chance to put his education to use. He still came into Enterprises to keep up his flying skills but most of his time was spent peering into far-away galaxies.

"Did Bob say how he is, aside from this discovery?"

His father chuckled. "Well, you know Bob. Business first, but he did, after I prompted him for probably the fifth time, tell me he is, now how did he put that, 'I'm in astronomy hog heaven, Damon!' I guess that means he is so excited about the new job not much else matters. So, would you like to hear the news?"

"Of course. It's just that since Bash had the baby my thoughts tend to have problems switching from family to work. So, what did he discover?"

Damon shook his head. "Not him. Not even our own Observatory. The Large Field Telescope Mark II they put up last year in Australia has just announced they've definitively located another small planet outside the orbit of Pluto."

"Hey, that's great! How many does that make?"

"Three for certain, two more are theorized from gravitation

distortion, and one that might be simply a radio echo from the old New Horizons probe. It supposedly shut down years ago when it got about ninety-million miles past Pluto and where it could be by now is about where the uncertain blip is." He shrugged. "Anyway, Bob wanted us to know about it because it is within our theoretical ability to get to. Seems this one is much closer to Pluto than any of the others. Only about twenty-million miles farther out from its apogee."

"Ahh. So," Tom began trying to run a calculation in his mind, "that might give it a yearly orbit of, hmmmm, five hundred-sixty years or something like that?"

Damon shrugged again. "I've not tried to compute that, so I will take your word for it." He became very serious. "Actually, the reason Bob called was to give us a heads up. All the data is not in, but it appears that this little planet, two thousand or so miles across, could be coming into the path of Halley's Comet. They are due to come to near intersect position in five months. Although, they could pass harmlessly by millions of miles."

Tom's eye went wide. This was definitely not good news. With this forthcoming pass of the comet it would be coming closer to the Earth than it ever had in recorded history. Just two million miles, and in space, that was a close call.

And, if it were to even slightly have its path shifted by a near miss with something possessing a gravity field, that path could come much closer.

Perhaps even far too close for comfort or the safety of the Earth!

CHAPTER 2 /

THE OTHER NEW OUTPOST

THE NEW space station built, owned and operated by the Swifts was a couple months from completion. Unlike the wheel of the original Outpost in Space, this was a huge tube, rotating along its central axis to provide about 3/4th Earth gravity to anyone standing on any inside part of the hull.

As soon as Tom had finished using the new, giant space ship, *Goliath*, on his travels out to the wormhole, she was put to her original use to haul many of the large items up on her wide platform that could not travel on the High Space L-Evator Tom had built at the beginning of the project. *Goliath* could carry loads in excess of nine times the capacity of the space elevator in weight and seven times the physical size.

Currently it was making daily runs up and down taking things such as desalinated seawater, air, and equipment necessary to recirculate and clean both.

One other large item to go up, and would take the trip in another three weeks, was an incredible new telescope system more capable of any previous space telescope. The interesting thing about it was it was based on one of the oldest of all space telescopes.

Tom had already created what is known as his Super SuperSight, a high-definition video system mated with precision optics along with a technology from a satellite with recently declassified CIA satellite capabilities. He spent a bit of his spare time during his vacation following the birth of his son, Barton, designing an even more precise telescopic system. Part of it depended on him being able to take the old Hubble space telescope from its position now far out beyond Earth's orbit and claim it as space junk.

The U.S. Government, never an organization to value anything past its prime, had gladly signed it over at no cost.

He would have been willing to pay up to a million dollars for it.

Bud and a small crew had retrieved the Hubble a couple days later and brought it back to Enterprises where a team of electronic specialists and opticians carefully dismantled it, cleaned everything, replaced several time-worn or damaged

components, and were currently in the process of reassembly.

When ready it would be mated with a new adaptation of the SuperSight that not only could amplify a picture, it could process and adjust for nearly any light conditions.

In short, it would be nearly fifty times as powerful as when it had been designed in the mid 1980s.

Tom redoubled his efforts to complete the renewed observation device. He wanted to provide astronomers the world over with the best pictures of the new planetary body—designated 2026/15A/5—possible without anyone actually being out there.

Sitting at the breakfast table with Bashalli, who was feeding little Barton, he had been perusing the *Shopton Bulletin*, the local daily newspaper edited by Dan Perkins who had been both a friend and nemesis to the Swifts. Over the years he had either jumped the gun by announcing confidential Swift information, or had outright made things up for the sake of selling papers.

The relationship was contentious to say the least.

Currently Dan was under a court order to refrain from publishing anything about the Swift companies not directly provided him by the Swifts. That did not, however, extend to him "reporting" things that might impact Enterprises.

"Ah, rats!" Tom exclaimed spotting a headline on page five. "Listen to this, Bash. 'This newspaper cannot help but wonder if the forthcoming French super space wheel will make our local industrialists' big tube station obsolete before it ever gets off the ground.' Talk about uneducated and just skirting that order Judge Cadwalather delivered."

Bashalli finished feeding their son and was draping the baby over her upper chest and gently patting him on the back. Before she could reply, Bart obliged her efforts with a very wet burp.

Tom handed her a towel and she wiped up the results from her shoulder.

"Is Mr. Perkins so oblivious to the facts that he believes you still have to launch the new station?"

In spite of his current state of grumpiness, Tom chuckled. "Getting something off the ground can simply mean making it fully functional, Bash."

"Oh. But, doesn't he know it is already operating up there? You told me that at least one hundred of the crew are living there now and helping with the completion. Did I understand that

incorrectly?"

Tom reached over and took the baby from her, cradling his son and cooing a little at the pink-faced boy.

"No. You understand it exactly. We can't announce to the world what we are doing up there because the world at large still distrusts it. I guess even I have to admit that having something that big hanging over all our heads could be disconcerting. But, the fact is Dan Perkins is in the same darkness as the rest of the planet. We had so much trouble with the United Nations over building it, and they still want to post a military presence up there, that we have to remain mum on everything."

She nodded and went to change her blouse. When she returned Bart was asleep in his father's arms, looking very satisfied. Bashalli felt a small tear come down from her right eye telling of the emotions she felt on seeing their child so happy with his father's embrace.

In a lower voice, Tom told her about the progress on the new super telescope.

"We've decided to call it the Callippus Telescope after the Greek astronomer who first proposed that the Earth year is 365 1/4 days long. Way before his time and correct to within a few minutes. Anyway, once it is operational we will beam everything it views to a distribution facility that will send it along to every observatory and registered astronomer who wants it."

Her face scrunched into a small scowl. "But, does that mean they will only see what you want them to?"

The idea hadn't occurred to Tom. Now, he had to ponder this. Finally he said, "I suppose we will need to offer those same people the chance to tell us what to turn the scope toward. I'll run that by dad this morning. Speaking of which…" he nodded down at Bart and handed the baby over to his mother when she reached out to take him, "…I've got to get out the door pretty soon. Day three back in the office and I'm just starting to feel like I belong there."

It was true. His coming back had been difficult. His body was exhausted. After two weeks of building his monocycle, designing the telescopic enhancements, and trying to be supporting of his wife's having to feed the baby at least twice each night—and that meant getting up with her about half those times—and Bart being the kind of baby who only slept in two-hour increments at present, his hours were topsy-turvy and his attention span was minimal at best.

By the time he arrived in the shared office, he had made up his mind that what he needed was a full twenty-four hours of sleep. Of course, he knew this would be impossible without some sort of medication, and he disliked taking any sort of sleeping pill even on long space flights when it was to his advantage to be asleep during high acceleration periods.

"Good morning, Trent," he greeted their secretary and Damon Swift's person assistant. "In case I forgot to mention it, Bash sends her thanks for the baby sling. She feels better having little Bart snug in front of her when she moves around the house and not having to carry him all the time."

Munford Trent smiled, something he did not do all that often. "Your wonderful wife sent me a thank you card the day after I sent that home for her. But, I thank you for your thank you. Your father is over with George Dilling in Communications, but should be back in," he checked his watch, "ten minutes. I haven't stocked the office with coffee. Want some?"

Tom gratefully admitted he was desperate for another cup. As he entered the office, Trent headed down the hall to Chow Winkler's little kitchen where the necessary equipment was available.

When Damon came back Tom was half way through his mug.

"Tom. You look like I felt when you were born. Great feeling even if you look like something dragged in by the cat. Right?"

Tom smiled and nodded. "Yes. You have my sympathies and apologies for any trouble I was at any point in my first few months. No… years. Make that *years*. So, I guess you saw the paper this morning?"

Damon frowned and nodded. "I'm heading up to talk to Jackson in a few minutes. They didn't mention us by name but did postulate on the status of one of our projects."

Jackson Rimmer was the senior legal counsel for Enterprises and a man who could switch between ranting and raving in a courtroom or over the phone about legal matters, and giggling over juvenile jokes the next instant.

"So, tell me about the telescope progress," he requested.

Tom said the entire package was a week from completion and would be taken into orbit for a week of testing before being brought back for fine-tuning and then delivery and installation.

"Bash had a question that I hadn't contemplated. Tell me what you think." He mentioned the current level of distrust over

the station and what a "forced feed" of the telescope's images might do to enhance that.

"So, you are getting to the point where you will suggest we allow registered astronomers and observatories to reserve time for specific observations?"

Tom chuckled and nodded. "Got it in one, Dad. I'm sensing you already were going to tell me to do that."

"I would never order you to do that, but I think you can see the positive effects. I was talking to Bob Jeffers and he suggests we could make due with about three days out of ten specifically for our own use and then let the world at large determine how it is used the other days. Thoughts?"

"All positive, Dad. I'll ask the project scheduling folks to come up with a sign-up website."

Damon asked about a few specific details of the imaging and processing that Tom easily answered before he turned the questions around.

"What's going on with the French space wheel? You created the little cargo movers for them that we repurposed for *Goliath*. The last I heard they had them just parked up around the central hub they've already put up. No new progress?"

With a shake of his head, Damon replied, "The realities of what Dr. Komura and I both spotted that were seriously wrong with their design finally reared its head and they have halted construction until the design can be reworked. I'm guessing they are in for months of redesign for taking their own tack on this. If they would simply stop being so, well, stuck up about it and take what Saji and I suggested months ago, they would possibly be able to go back up in a few weeks."

"Wasn't most of what you two told them having to do with inside the shell?"

"Yes. Most of it other that the structural weak points where they wanted to have tracks embedded in recesses along the bottom of the hub so they could use a single ion drive for repositioning. To tell you the truth, with them going ahead and building most of the hub already, I have zero idea if they ever addressed that."

Tom was quiet for a minute as he watched a moment of anger cross his father's face. "What is it, Dad?"

Damon took a deep breath and let it our slowly.

"The French government has made a request for the United

States and Great Britain to reposition some of our communications satellites. It seems they want to be able to claim eminent domain in space for a thirty-degree arc of geosynchronous orbit extending from eight hundred miles east of Guinea-Bissau all the way over to the east side of Sudan." He shook his head in disgust.

"But, that's at least three of our satellites and even four of the worldwide Com-Sat network and I can't even think how many Global Positioning units are up there."

"Yes. I know. The number is three from the U.S. system, Four from the European system and three more from the Russian system and we believe there is some sort of spy satellite put up there by Pakistan last year. In all there is a satellite of some sort about every one-point-two degrees."

Damon had mentioned Pakistan in a quiet voice. Because Tom's wife was originally from that nation, but had moved with her family when just ten and had grown up as American as possible, he didn't want the mention to sound accusing.

"Don't worry about the whole Pakistan thing, Dad. When Bash heard about their rocket launch, the one they *claimed* went awry and disappeared, just about the time it would have reached GS orbit over Niger or Chad, she snorted and told me, 'In a pig's eye they lost that! My auntie back there told us it was a huge camera satellite meant to spy into Europe!' I guess Bash's Auntie's word is good enough for me."

They both grinned at this but turned serious when Tom asked, "So, what do we do about their request. You can't believe the U.N. or any other government with equipment up there will accede to it, do you?"

"I don't know, Son. I've put in a call to the State Department and also to a few old friends down at NASA to see what they may have heard. All I do know is one of the things the French have said is how they feel it unfair that our new station is allowed to go wherever it wants to and they must live within stricter location rules."

"But, our station is tens of thousands of miles farther out from theirs. It orbits, a lot slower to be sure, around the globe like anything not in geosynchronous orbit. If they refuse to come on up, and not park next to us, I don't see any reason for them to complain."

"Neither do I, but the Secretary of State is not someone with any scientific or even engineering education. She comes from a long line of politics-only family members. It is all she

understands. Fortunately, we have Pete Quintana in D.C. to go to bat for us. She listens to him."

Peter Quintana was the senior senator from New Mexico and the second-longest sitting senator in Congress. He had been a friend of the Swifts for a decade or more and had helped them keep the folks who made things run in Washington—even when they got in the way—from going too far astray.

When he was told of the Swifts' suspicions, the senator let out a heavy sigh.

"I already know about that," he admitted. "It seems that the man you dealt with on those little one-seater space runabouts, Claude Feries, has been fired from his position and snuck out of France. He came to D.C. and started blabbing about their intentions to anyone who would listen.

"And, did that include you?"

"Hell, it was just about *only* me!"

"So," Tom asked over the speakerphone, "what did he tell you?"

"That the French are attempting to rework your little space ships into remote-controlled satellite-killer suicide ships!"

* * * * *

With a series of back-to-back test flights facing him the next morning, Bud had come home at four to spend time with Sandy. He even helped make their dinner of beef stroganoff and hand-made noodles. Not hand-made by either of them, but coming from a little shop in downtown Shopton that specialized in pastas.

They sat down at six, about an hour earlier than they normally did.

When she told him she and Bashalli were going to fly over to Oswego the next morning to do some shopping for little Bart, Bud stopped eating for a moment to remind her that she and Bashalli seemed to get into trouble when they were alone, together. "Assuming that makes sense," he added.

In their own dining room a couple miles away, Tom and Bashalli were having the same conversation.

Both wives had—when they rehearsed that afternoon—the same answer.

"If you can't trust me to stay out of trouble for a nice half day over in Oswego, then you will have to come along!"

Both husbands had the same—unrehearsed—reaction. And so, after flying over from Enterprises to Oswego and landing at the small municipal airport, the two ladies, unaccompanied, were walking through the downtown area waiting for several of their favorite shops to open.

"Well!" Sandy harrumphed and pointed out a man, possibly in his late forties walking arm in arm with a *much* younger woman, one wearing far too much bright makeup!

"*He's* certainly punching above his weight class!"

Bashalli looked at her uncomprehendingly.

"Batting above his average?"

Bashalli still had no idea what she was talking about. She shook her head.

"Driving down life's Autobahn in a Ferrari when he ought to be behind the wheel of a little Fiat?"

Tom's wife stopped walking and pondered this for a moment before her face brightened.

"Do you mean he is dating above his income level?"

Sandy laughed. "No. He *is* the income level and she is the one well below that! Don't you recognize him?"

Bashalli said she did not. "But, at this distance I cannot make out a lot of his features."

Sandy laughed and began waving and shouting "Hey! Hey!!" As the man turned in the direction of the commotion Bashalli finally got a good look.

"Why, that's Jon Wolff!" Now, she waved and shouted, "Hello, Jon!"

Jon Wolff had been instrumental in both saving the girls' lives about five years earlier when they were being stalked in Oswego, he also turned out to have a piece of engineering understanding Tom had used in creating his now widely-used QuieTurbine jet engines. A drag boat racer with years of experience, he had traded his expertise at maximizing turbine power with Tom, who helped build him a stabilization system that meant he would have do be driving his high-speed boats like an imbecile to ever again have them go airborne and flip in return.

He also owned one of Sandy's favorite stores in the small lakefront city.

With the younger woman in hand, he came jogging over to them. He looked incredibly glad to see them while she looked

very put out by the situation.

Good, thought Sandy. *Serves the hussy right for latching onto poor Jon!*

"Ladies! How wonderful to see you both." He gave them each a warm hug and a kiss on the cheek. "I read in the society pages of the New York Times that you," he pointed to Bashalli, "are married to our fair haired boy. Someday you will have to tell the story of how you managed that. Oh, but I'm being awfully impolite. Sandy Swift and Bashalli Pran… oops. Sorry. Bashalli *Swift*, I'd like you both to met my little sister, Evelyn."

Sandy's face went bright red causing the other woman to stare openly at her. "Are you okay, Miss Swift?" she asked.

Sandy laughed. "Yeah. I just stifled a big burp and I guess my face went all funny. It's *so* nice to meet you. We've known your big brother for, gosh. Five years? Wow. Long time, huh? It is nice to meet you, Evelyn. Do you live here in Oswego?"

"Here? Oh, gosh no. Too dull and dead. No, I'm living in Boston these days right in the heart of the Back Bay. It's a *very exclusive area*. I'm an advertising *executive* assistant with Bangey, Dent, Fenchurch and Tizer. A *very prestigious firm*. So, what is it that *you* do?" To Sandy she looked and sounded like the sort of woman who places much importance on her position in society. Her emphasizing of a lot of the more important-sounding words spelled that out in spades.

Jon looked askance at his sibling and was about to say something when Sandy answered.

"Well, I am currently working at Swift Enterprises over in Shopton. I'm the lead communications advisor for their Communications department." She paused to see if the name has registered. It had not. "I suppose my only other two claims to fame are I'm the daughter of Damon Swift, owner, manager, CEO and President of the Board of Directors of Swift Enterprises, The Swift Construction Company, and about six other *very prestigious, international* companies and space stations. And Bashalli here, is the wife of my brother, a rather famous inventor by the name of Tom Swift. You may have heard of him over in Boston."

Jon was turning bright red he was trying to hold back the laughter so hard. Finally, he gave in and a series of incredibly loud guffaws could be heard for several blocks.

"Guess Sandy and Bashalli have you beat, sis. I'd drop the 'I'm an important woman' routine before it bites you on your plump

little —"

"Jon!" Sandy said in a warning tone. "She wasn't to know who we are, and I'm sure that the company she works for is slightly larger than the Shopton Advertising Company where Bashi is their Director of Design and Development. Forgive my playing the 'Mine's better than yours' game, Evelyn."

Evelyn was now a little embarrassed. Her job impressed her friends back home and she never expected to find someone—two someones—who outclassed her by miles here in her brother's little home town. She held on a hand.

"Sorry. I can be a bit of a, well it rhymes with witch, sometimes. It's nice to meet you both."

"Evie and I were just heading for lunch. Join us," Jon suggested.

Seeing the small look of discomfort in his sister's eyes, Bashalli replied, "I'm sorry, Jon. We can't today. But we appreciate the offer. Nice to have met you, Evelyn."

"Well, I'm sorry to hear that, but we'll make it soon. Sooner than the three or four years it's been. Okay?"

"Okay!" Sandy and Bashalli chorused. The girls hugged Jon again and they headed off in different directions.

"Well, that was rather awkward, Sandy," Bashalli said. "I thought women like that were only real in the movies and on television."

Sandy laughed. "And, right here in Oswego, New York, visiting from the *Back Bay* in *Boston*, *Massachusetts*."

CHAPTER 3 /

TO SPACE

THE REST of their visit was uneventful except for when they entered Jon's big store after they ate lunch. He must have told his employees to be on the lookout, and someone had tipped him off they were now inside.

As they looked over a collection of baby clothes featuring the latest cartoon characters and discussed how the baby didn't care about that—they were for the benefit of the parents and other adults—Jon came up behind them.

"I want to apologize for my sister's attitude," he said as soon as they turned and saw him. "She is really a half sister, same dad, different mother, who was raised to believe in and *only* in the almighty dollar and anybody's position in society. Especially her own."

Sandy shook her head. "She could be a pretty girl, or I ought to say *woman* since she is a few years older than we are, but she's... well, she's so..."

"Stuck up, nose in the air, and self-important are the terms I believe you are looking for, Sandy," he said. "She wears that like a vicious scar."

"Yeah," she responded with a sigh.

They chatted a few more minutes before he made a "come with me" motion with his right index finger. They waked down a couple aisles and then into a dressing room entrance, but instead of turning left to the actual rooms he turned right and took them through a door marked EMPLOYEES ONLY!

The room beyond must have been about half again as large as the public space on the second floor and was filled with shelves and racks of items sold throughout the store.

He didn't stop until they reached an area filled with infant and toddler clothing.

"Take a look through what will go out on the shelves in three weeks," he invited them. "Pull out as many things as you want and don't only be thinking about the baby at this point. Think three, six and even twelve months out. And," he held up his hands in surrender, "I won't tell you it's all free because I know that will put you off. Let's just say that this manufacturer is new and anxious to get into stores like this one, and has provided me

a lot of free items. I doubt you could carry enough between you to come close to costing me a red cent, so I won't lose anything if I tell you everything you find in this area will ring up at exactly two dollars apiece!"

After placing the back of her hand on his forehead, Sandy turned to Bashalli. "He doesn't seem to be running a fever, Bashi. Guess he is healthy and sane, so I suggest we do not look this very handsome gift horse in the mouth—I'll explain that old saying in a minute—and see what Bart might look cute in as he starts to grow."

Bashalli stepped over to Jon and, going up on tip-toe, kissed him warmly on the cheek. It made him blush. "You are an incredible man, Jon Wolff. So nice that I will forget any little failings of your sister."

In all they found seven outfits—including a small selection of shoes in increasing sizes—that Bashalli wanted. And, good to his word, Jon had notified his checkout people of the "secret sale prices" the ladies were to receive.

When Tom got home that evening and saw the clothes arranged all over the sofa and his favorite easy chair, he took a serious look at Bashalli. She smiled back at him and then told him of Jon's largess.

"I'm going to have to remember to build him another stabilization system one of these days. Much faster processing and reaction time," he promised.

Dinner conversation turned to the discovery of the far-off planet and what its position and possible encounter with the comet might mean.

She was aghast at the possibility the planet might shift the comet's path enough to brush close to the Earth.

"But, could it not also hit us?" she asked with a gasp.

Tom began to shake his head but stopped. "Well, the mules out there would do everything to keep that from happening, but unless we have some pretty specific course and speed information, and weeks or a month or more in advance to compute all the variables, they might just fling it into an even worse course. I'd hate to spare us only to have to do some fancy emergency maneuvering again if it turns out the comet might hit, say, Mars, with all the colonists up there. Or, take out the Moon on another pass through."

"Or, hit anything?" she offered.

"Right. So, there might come a time in the very near future

when I have to go out there and take a good look for myself."

That was not good news for the new mother and a tear told Tom he ought to have softened that statement.

"What I mean is, I need to find a way to get something out there to take a close look and a lot of measurements. Heck, if it were a manned mission even at double G acceleration and slowdown, it would take half a year round trip. And," he said as a thought occurred to him, "I'm not certain I have anything in our space ship line I could trust. Repelatrons need to have something to push against both to speed up and to slow down. With Pluto moved on and even Uranus and Neptune almost on the other side of the sun these days, what do I push against? Then again, if this planet is as small as Bob Jeffers thinks it might be, does it have enough mass for repelatrons to press against to reduce our speed. It might be we just shove it out of the way. So, no panic right now, Bash. A lot of things need be worked out before I'd attempt a trip like that!"

She seemed mollified for the time being, but he found that she cuddled up very close to him in bed that night and seemed to have trouble falling asleep.

The next day he took the one-hour drive up to the Observatory located in the hills to the northwest of Shopton. Built with private funding, it was opened to the public and to other astronomers who wished to take advantage of the best viewing condition outside of the outback in Australia since the closure of the Keck Observatory in Hawaii a couple decades earlier.

"Well, hello skipper!" Bob greeted his former boss. "And, congratulations on the baby. I read the company website and saw the pictures Bashalli posted on her own page. Gonna be a lady killer when he gets to about fourteen!"

"Hi, Bob. We're still sorry to have you here and not at Enterprises, but I understand the putting your education to use thing. Mom did that more than eighteen years ago after setting it aside for Sandy and me. I only hope you are happy."

"Ecstatically so, Tom. I would guess you came all the way up here to discuss the little planet. By the way, we've started calling it Eris and the international astronomy body has designated it 136199 Eris. Sexy name, right?"

Tom's face scrunched into a frown. "Umm, forgive me if this is wrong but didn't Eris get discovered way back in the early part of the century. Like around two thousand-four or five?"

Bob nodded. "It did, and then for some reason nobody could

locate it starting about nine years later. We now believe it is a trans-Neptunian object with an even more eccentric orbit than Pluto, and it was on the tail end of its outbound path. Now it appears to have turned around so we are getting a new look at it. The reason it was never discovered before that is a matter of optics. At roughly a third the reflectivity of Pluto and traveling outbound rather than through, even the faint solar radiation winds didn't paint it so we could see it."

"I hear there might be some concern about how it will interact with Haley's Comet."

Bob nodded. "Yeah. We're still collecting data, but it appears the mass and gravity of Eris may interfere with the travels of that most famous of comets. Only, we aren't certain how much and to what end result. I, uhhh," he started looking at the younger man, "I don't suppose you could send something out there to check for us?"

"I was really hoping you wouldn't ask that, Bob." He explained the repelatron issues and his fears of sending a manned mission out. "Even an unmanned mission might flash past unless we slow it down enough so it goes into some sort of orbit."

Bob shook his head. "Not around Eris. She has a moon, Dysnomia, but we can't tell how big or what sort of orbit. I'd hate to have you send something out only to have it crash."

Tom said he agreed.

"How much time do we have before there is any interaction?"

Puffing his cheeks out and exhaling a long breath, Bob shrugged. "Six months, eight perhaps. We aren't certain because we don't have good visuals. But, I hear you are reworking the old Hubble into a sort of incredi-scope. When can we got our hands on that?"

"It will be going up for an orbital week of tests and then out to the new space station starting next week. If you promise to play nice, I'll let you have one of the test days, or at least fifteen hours of it. Can you make due with that?"

Chuckling, Bob replied, "Can I and we ever!"

He provided Tom with a large folder full of data and some blurry images of the object he said was slightly smaller that Pluto but probably at least a quarter again as much mass.

Before leaving, Tom asked about the other possible planets out there.

"Not just out there, Tom. Remember we have Ceres in the

asteroid belt. It is under six hundred miles across and may have been the moon of the planet we are pretty certain used to be out there but got plastered by something incoming millions and millions of years ago. It is far too round to be a chunk to the planet unless it was once its molten core."

He also mentioned the probability of another dozen planetary bodies out there.

"One of them we call 2003 EL sub 61 is shaped like a medicine capsule. We've postulated that it is mostly liquid, perhaps even a core of mercury and a surface of another liquid, that is spinning end over end giving it that shape. By the way, the old observatory on the island of Hawaii once gave it a Hawaiian name, Houmea."

By the time Tom left he had heard about Sedna, Orcus, Quaoar, Varuna, Ixion, Vesta, Pallas and tiny Hygiea as well as four or five others that only had numerical designators. His head was still swimming when he stopped off at Enterprises to leave the folder on his desk and to tell his father of his newly extended knowledge.

"Did you know, because I sure didn't, that Hygiea is small enough that it could sit on the Panama-Nicaragua border and only just span from the Atlantic to the Pacific at that point? It isn't a moon and yet it may become one in about thirteen million years when it and Pluto pass in the night."

Damon laughed. "That's the problem when dealing with a born-again astronomer. Or, a fad dieter for that matter. They suddenly have this huge amount of energy to explain everything they know. Bob won't steer you wrong, but he will pack on the data. I'd head home and let your brain unwind, then tomorrow I hear your space telescope team wants to have a show and tell for you. Tell me when you can do that and I'll let them know for you."

Tom suggested about ten the next morning.

"I'll pass that along!"

When the young inventor arrived at work the next morning he went straight to his desk in the shared office and began pouring through the folder given him by Bob Jeffers. It documented more that two decades of studies of the distant minor planet with some earlier beliefs and observations either contradicted to skewed somewhat by more recent findings.

But, it pointed to one statement the astronomer had made.

"Tom. Right now we know more about what's going on in several distant galaxies than we do about what is in our back

yard."

When his watch dinged its alarm announcing the need to get going for the space telescope meeting he had a page full of notes he wanted to bring up to the team.

He came into the meeting room and shook hands with the eleven people. Each one had been part of the team that had refurbished the Hubble when it had first been needed to try to observe things going on at the edge of our solar system years after it had been first decommissioned. Now, mostly the same people were turning Hubbell into Callippus.

"Okay, let's get this going. I have a few items I want you to know about and it all plays right into our new spyglass to the stars."

The reports by three team leads were positive. All parts of the rebuild were ahead of schedule by one or two days.

"That fast refocus routine you sent over does some amazing things, skipper," Duanne Dimmock, lead on the electronics components team said. "With that in place, and just using the thing to look up at the Moon, we can watch it refocusing fast enough to cut down ninety-five percent of the atmospheric and heat distortion. We are all thinking it might be a nice little side line for outfitting all terrestrial telescopes."

Tom was surprised. "All telescopes?"

"At least the ones that use high-res video to put things up on a screen. It won't help direct-view types, but these days that is mostly the hobbyist scopes."

Tom asked Duanne to bring it up with his father before turning to the next report.

"Well, overall the Callippus will be ready to go up for its testing a week from today."

Everyone, including Tom, gave a little cheer.

It was decided to complete the rest of the installations and then take it to the clean room where it would have even the tiniest speck of dust removed before it was sealed, in the following four days. That would mean it could go into orbit one day after the team had stated it would be ready.

"I'm arranging to take it up sealed in a vacuum bag on the deck of *Goliath*. I know three of you have qualified to go into space and I also know most of you would love to come up and see Callippus shoved into the abyss, so I've asked Doc Simpson to set aside this Monday for physicals and then Bud Barclay will take all comers who make it through that into a half day of

intensive training."

He mentioned none of them would actually go outside and that the giant ship featured Tom's own form of gravity that used a special body suit under their clothes to react with a series of tiny ceiling-mounted specialty repelatrons set to only work with the metal alloy of the fibers woven into the fabric of that body stocking.

"So, no floating around and so no need to qualify you in the anti-gravity simulator. Just a few simple things like how to get into your suit and check the next person's for them."

By the time it came to package the telescope, everybody who wanted to accompany it had passed, and they were anxious to go into space. This was specially important to Duanne who had once tried to qualify as an astronaut only to be told his lack of an advanced degree—in anything, not just something associated with space—had meant his applications had been turned down.

As he had once told Tom, "I made it through the first cut of five thousand down to one thousand based on my military experience and electronics background. But after the first stage of physicals they send a letter with a, 'Well, if you have a Masters or Doctorate degree we can continue, Otherwise, sorry,' tone to it. I'd earned an undergrad degree in mechanical engineering and was working one an electrical engineering degree at the time, but that wasn't good enough!"

Now, his smile was the brightest and widest Tom had ever seen.

As mentioned, the clean room had removed any hint of dirt, finger oil or anything else that might be an impurity and had inserted the telescope into a giant plastic bag. A vacuum sucked all of the air from it, and then the entire thing was strapped down for shipment to Fearing Island and from there to outer space. Even inside the giant silver body tube was mostly a vacuum.

Callippus was loaded carefully by the team into the forward storage pod of Tom's largest jet, the *Super Queen* and that was hoisted up inside the giant body.

Everyone kissed whoever had come to Enterprises to see them off, climbed into the jet and she had taken off for the island home of the Swift's rocket and submarine programs five minutes later.

Often Tom would bring the jet in like a normal aircraft on the longest of the two available runways, but the cargo was delicate so he used the repelatron lifters mounted at the front, middle

and back of the aircraft to set them down as lightly as a feather.

It required the services of the largest crane available on the island, one that had been used in the construction of *Goliath*, to lift the special package up to the cargo platform and set it lightly on the deck. Five members of the team had taken the elevator up and were waiting with the necessary hold down straps and connectors, so half an hour later everything was in readiness for takeoff.

Because of its enormous size and the open platform on which their cargo was sitting, the ship always took off slowly. So slow that on her first public liftoff one reporter had panicked and screamed that it was going to crash. That was quickly retracted as soon as she recalled the briefing materials they all received that described how it would take off with the speed of an average family sedan and not pick up any speed until it was about twice the altitude as commercial jets traveled. At that height, there was so little air that the buffeting they might encounter lower down all but disappeared.

Tom asked everyone to strap into their couches located in each two-person room around the lower deck perimeter. For this trip up there was a core team of eight regular crew and the nine members of the telescope team. So, each person was assigned a room of their own for the twenty-hour trip.

As soon as they reached one hundred miles he called over the intercom, "Everyone can loosen their harnesses. I'd suggest remaining in your couches until we go into coast mode in about two hours. Then, we'll have an hour to move around followed by a two-hour breaking period when you'll all be back in those seats."

He looked over at the African American man who was seated in what would normally be the third pilot's seat.

"So, Duanne. Is it anything like you anticipated?"

Duanne, who had been almost silently chanting, "I'm going into space. I'm going into space…" since takeoff looked over and smiled. "You want to know something, Tom? It's better than I imagined. I guess I never looked forward to the hard acceleration. This, I mean the slow and steady approach, I like very much!"

Tom glanced at his copilot. "Bud, why don't you and Duanne swap places. I think we can trust him to take command for a bit, don't you?"

With a grin Bud nodded. "You bet. It's as easy as falling off a log, as long as you remember this log is outside the atmosphere."

Duanne was given a few maneuvering commands he might make and his voice was registered as a temporary commander with the computer.

"Go ahead and speed us up," prompted Tom.

"Okay. Command… increase speed to five thousand miles per hour." He paused, then whispered, "Was that okay?"

Tom laughed. "It was so good I'll let you do the next one in five minutes up to twelve thousand, and then let you tell the ship to do the flip over at the mid point on our way to geosynchronous orbit."

When the time came Duanne handled it perfectly.

"I think we might have found a replacement for Bob Jeffers, skipper," Bud told him with a smile.

Tom agreed. "Duanne? If you ever want to switch out from your current job, or just get some extra training and then join us on a few more of these little jaunts, say the word. We recently had to say goodbye to one of our pilots when he went up to the Observatory, and dad and I have been playing with the idea of finding a replacement. You up for it?"

Duanne's face went from happiness to supreme sadness in an instant.

"I can't do that to you, Tom. You and your dad are fine people and as much as I'd like that, it wouldn't be a good thing for you."

When no more was forthcoming, Tom suggested they have a small private talk once the ship went into its half-hour coast.

At that point they both got up and headed for the small conference room to one side of the control room.

"So," Tom said taking a seat and pointing to another for Duanne. "What's this about?"

"Tom. As much as I'd like that pilot idea of yours I have to come clean. I've got a police record and I'm gonna assume that anyone up for a space pilot spot is gonna get a read close looking at by Mr. Ames."

Tom nodded but said nothing.

"You see," the man continued, now staring into Tom's eyes, "much as I'd like it, I've got a record. A few years back I killed a man!"

CHAPTER 4 /

DROP OFF AND RECOVERY

SHOCKED, TOM'S mouth formed the letter "O" and he blew out his breath. "Did you go to jail for it?"

Duanne shook his head. "No. The District Attorney decided to not prosecute me because of circumstances. I was protecting my baby sister from a man who was trying to have his way with her. Jeeze, Tom, she was just fourteen!"

As he told the full story, it turned out that the man was a prison escapee with a history of attacking young girls. He was wanted in New York as well as Rhode Island. Duanne had caught him trying to pull his sister from a line at a theater one evening and into a van.

The fight that ensued was short and the man ended up with a broken neck courtesy of Duanne's powerful hands.

"He sort of gurgled with some blood coming out his mouth and fell to the ground, Tom. The ambulance driver told me he died on the way to the hospital. Now do you see why I can't accept the offer? Heck, now you know this, Mr. Ames will probably tell you to have me fired."

Tom knew that Harlan Ames, Chief of Security at Enterprises, knew everything about every employee and would almost certainly have discovered this already.

"Duanne," Tom said in a soft tone, "I am not a violent man and yet I have a little sister who I would have defended against anyone when she was that age. I can't fault you for looking out for her. I also can't fault you for what is in the past now that I know about it and I certainly can't see you losing your current job. My offer stands. If you want to be trained as a pilot and either transfer to that or add it to your resume of things you can do for Enterprises, it's yours!" He held out a hand to the man.

Duanne had a look of disbelief on his face, but he took the hand and shook it.

Tom promised him nothing more was to be said about the admission or the previous incident.

When the ship arrived at the point where the telescope would be unpackaged and eased into orbit, they were sitting high above a point a thousand miles to the east of French Guiana at an

altitude of some 22,300 miles.

Tom, Bud and Zimby Cox, their spare pilot and a man with a lot of time in space and outside of space ships, headed for the lower floor in their space suits. The spiral stairs to the control deck folded up like an origami figure and the elevator came up from the floor to take its place.

"When we get to the bottom we go out the rear door of the elevator and into the airlock. Remember to check each other's suits and helmets, then we decompress."

The elevator reached the platform eleven few seconds later and a green light on the control panel told them the airlock was sealed to the outside and ready for them. The double doors slid to the sides and they stepped into the airlock, the elevator closing behind them. After a check of suits Tom pressed the **EVACUATE AIR** button on the wall and sixty-seconds later they were in total vacuum. The outer door swung to the side.

Each man carried a safety line they now clipped onto individual tie down points just to the right and left of the airlock door.

Because each of them knew what to do, the act of releasing the telescope from its palette, opening and removing the plastic bag containing it, and manhandling the weightless, yet difficult to budge due to inertia and its mass, telescope to the edge of the platform took only five minutes.

The three men grabbed a set of small railings around the base and gave a little lift. Seconds later the renewed telescope was a foot off the deck and starting to move off and over the edge.

"That's fine," Tom announced as it reached a few feet from the side. "Now we let the position motors do their thing."

They returned to the safety of the airlock as Tom radioed to the control room. "We're okay for you to send it into position," he told Duanne who had been primed with what to do.

As the three men retreated to the central elevator tower a small rocket pack flared briefly and the telescope moved off about a hundred feet before a second rocket on the opposite side halted its movement.

"In place, Tom," the temporary ship commander said on their radios.

"Great. We're coming back up. See everybody in a few minutes."

When they walked up the spiral stairs again everyone from

the regular crew and the telescope team cheered and applauded.

"We have a solid signal," the radioman said as the tumult settled down. "She's going through the self checks. Time to aperture opening, sixty-seven minutes, fifty-seconds. Mark!"

The *Goliath* remained in position until the wide end of the telescope began its slow opening routine. Too fast and it would affect the stability of the telescope. So, it was nearly an hour and a quarter later when the first blurry pictures came in.

"Ahh, those don't look at all good," Bud moaned. But, his tone changed a moment later when the planet Saturn, currently only twenty-one degrees from straight out from the Earth came into incredibly sharp detail. There was a sharp intake of everyone's breath as the tiny moon, Charon, passed between them and the planet's surface. Something else came into focus for a moment and then it was gone.

Duanne was the first to find his voice. "Did we just see what I think we did?" he asked.

Tom nodded. "Yes. That was the *Intrepid Adventurer* probe sitting in a two-mile-high orbit around that tiny moon. I hope we have that on video because that is one of dad's probes. He'll be mighty happy to get a look at it."

"Got it, skipper!" came a call from one of the technicians. "It's clear as can be!"

They stayed near the telescope another hour before taking a fast trip back home. As before, the last seventy thousand feet were slow but they touched down at Fearing right on schedule.

An hour later the entire team and crew were landing the *Super Queen* back at Enterprises.

When morning came Tom reached his desk to find a call waiting for him. It was Bob Jeffers.

"Skipper? I can only find one word to express my feeling right now. Stupefied! I've never seen better or cleaner pictures of our planets. I'm sitting here with the control stick in hand and just finished taking detailed photos of Mars. Got the colony right in the middle of one. I can make out the space between the inflatable habitats. Wow!"

"That's great, Bob. When do you want to try for shots of Eris?"

"Well, with our time for today over in two minutes I think it won't be until tomorrow. I'll send you everything we get, and then we can discuss it."

Tom debriefed his father on the telescope launch and

mentioned Bob's imaging before he pointed at the conference table. "I want to show you one shot we got from the first few minutes of operation."

Moments later he heard his father gasp in astonishment and pleasure at the still frame showing the huge gas giant planet in the background, the moon in closer focus and the small robotic probe built by Enterprises and launched three years earlier as it stood in sharp relief in front of the rugged moon.

His voice was husky with emotion as he said, "I've always wanted to see something like that, Son. I know we get the resulting photos from the probe but this makes it all seem so… absolute! Thank you."

Tom resolved to have a large blowup made and framed. It would be Mr. Swift's birthday in another few days and this would be a great gift.

As he hoped, it was the hit of the party that included Bud and Sandy, Tom, Bashalli and little Barton, and Bashalli's mother, father and her brother, Moshan. It was the big five-oh for Damon Swift and only an outright threat that he would walk out on anything that was, "too big and too much," kept it from being held at the Shopton Yacht Club with an invitee list of over one hundred.

Chow Winkler catered the event that took place at the Swift home that did include fifteen other guests, but all were close family friends like Jake Aturian and his wife, Marion. As one of Damon's oldest and closest friends, it would have been impossible to not have him there.

"Thank you, everyone, for this," Damon said as he stood and raised a glass of wine in a toast. "I didn't want much of a fuss made over this birthday of mine. Certainly, fifty is a milestone, but as anyone who reaches this age will tell you, I feel like I was still eighteen. Having a wife who refuses to age," and he looked lovingly at Anne who did look about the same as she had since turning thirty, "means the only thing that makes me feel old is watching my children grow up and my hair grow gray. And, having Tom and his wonderful wife, Bashalli, make me into a grandpa."

This got a lot of laughs from the assembled guests and a kiss of appreciation from Anne. Everyone was stunned at the photograph of the probe. One guest suggested making it into a poster for people to buy it was so impressive.

The party broke up at about eleven with many of the attendees taking away leftovers courtesy of Chow and a stack of

containers he brought "Jest in case folks don't get enough vittles at th' party!"

The following morning a detailed report came down from the Observatory. It didn't look good. In part, it read:

> The most recent tracking data based on the testing of the new Callippus telescope is showing that the encounter we had hypothesized may be closer and slightly sooner than originally thought. It is our determination that Haley's Comet will pass within a few dozen thousand miles of the planetary body, Eris. Or, closer.
>
> Further, being a dense and possibly massive planet, Eris will almost certainly exert some gravitational influence causing a course change in the comet. Mitigating this is the incredible speed at which the comet travels and the relatively low mass it contains.
>
> Compounding (possibly) the event's outcome are a few unknowns including: magnetic metals contained in either body; actual proximity at Closest Point of Approach (CPA); and any other gravitational encounters Haley's will experience based on an altered trajectory.

Damon set the report down and sighed. It was always something.

Tom breezed into the large office a few minutes later. Seeing his father's expression he was unsure whether to ask what was going on, or to leave the older inventor to his thoughts. But, Damon looked up and gave his son a small grin.

"Hello, Tom. I was just looking over some new information Bob sent down. It's based on your new telescope and what it is seeing all the way out past Pluto." He handed the two-page report to Tom and waited while the young man read it through.

"I was afraid it would be something like this," Tom admitted. He sighed and shook his head. "It never seems to be news that goes the good way, does it?"

Damon gave a brief, frustrated chuckle. "No, it certainly doesn't. Now, I'm going to need to get together with Pete Quintana to see what he wants us to tell the President. Then, it might be an address at the United Nations, and we both know how *that* might be received."

The young inventor sat down behind his desk. "What do we

tell people… and who do we tell first?"

"Well, first you and I call Pete's office and have him set us up with an appointment to see the President. Then we tell them both exactly what we are seeing. Even before we turn over any access to the new telescope to other observatories or astronomers, they must be fully advised as to what might happen."

"And, what we can do about it?" Tom questioned as it seemed to be something he would put on the impossible or at least impractical side of the list at the moment.

"We need to start by reminding them of the incredible job your mules are doing out there already and what sort of ramp up we might be capable of in case we need to move off more pieces than the current set of them can handle."

Tom's mules, also more properly known as his Space Battering Rams, were autonomous craft of great power that featured one of his inventions, the Attractatron. When used in conjunction with his repelatron technology—which it also employed as part of its ability to grab onto and hold just about anything—the mules could anchor themselves in a position where they could grab hold of space debris, slow it or speed it up and fling it into a harmless new path. Dozens of objects that would have hit the surface of the Earth and thousands of ones that most probably would have burned up but could be handled, had been sent into a new path taking them into the sun.

"But, Dad, the mules haven't been needed for anything as large as a chunk of incoming comet before. Well, other than the asteroid we were able to keep from hitting us. What if the entire Haley's Comet heads our way?"

Damon though a moment. "Not to sound too facetious, but if I said the words *scaled* and *up*, does that bring anything to mind?"

Tom shook his head. "I'm saying no but not because the upsizing is wrong, it is the physics of what we anchor against and push against. What happens if we use the Moon, and shove it out of place? What if the only way to avoid the comet collision is to ruin the balance between Earth and the Moon? Or, what if we have to push so hard against part of the planet that has a large population center and the repelatrons crush things?"

It was a lot to think about and they sat in silence for over fifteen minutes before Damon reached for the intercom button. "Trent? Can you see if you can find Senator Quintana for us? Tell his aide it is Swift Urgent, please."

It required half an hour and pulling the second most important figure in the U.S. Senate from a meeting with the Speaker of the House, but Pete Quintana's face flashed into existence above the conference table using the 3D Telejector system that had replaced the office's traditional televisions and computer monitors.

"Damon. Tom," he said nodding. "I hear a rumor we have a bad thing on the horizon. Talk to me."

"Hello, Peter. Listen. I know we have all sorts of security measures in place but I have to ask if we are in any way going to be overheard."

The Senator looked down and appeared to be pressing something. "There," he said looking back at them. "Damn the FBI and their security measures, but I've disconnected this office from the outside world for a few minutes. Go ahead."

They described what the new telescope had seen and what it might mean, in the most negative of possibilities, for the Earth."

"If you can get down here in two hours I'll ensure we have the President's ears and eyes for half an hour at the very least," he promised.

"We're on our way!"

They landed at the downtown airport eighty-six minutes later and were whisked to the White House in a waiting limo. The driver was known to them both and had been Damon's driver for nearly all his overnight visits in the past three years.

"Great to see you again, Mr. Swift. You as well, Mr. Swift the Younger," he said smiling back at them in his rear view mirror. "Have you at the back door in eleven minutes!"

They were checked into a small reception room behind a nearly invisible door in the back wall of the White House, given an armed Marine escort and taken upstairs in the small elevator that seemed to be the only other exit from the room.

Senator Quintana was sitting on the edge of the President's Executive Secretary's desk waiting for them. He stood up as soon as they came around the corner and into the alcove. They shook hands and the Marine guard saluted using his rifle, did a precise about-face, and left them.

"The President will see you both in fifty seconds. Please stand ready at the door, gentlemen, Senator," the woman who ran the Oval Office said to them.

On time a small light flashed on her desk and they heard a

slight *click* as the door was remotely unlocked allowing them access.

Only the briefest of formalities were observed before the President indicated they should take a seat.

"I will get directly to the point, Sir," Peter Quintana said. "The Swifts are testing the most powerful and feature-rich telescope in existence at their new space station, and they have spotted something that might have dire consequences as it relates to both our planet and possibly our very lives."

Damon picked up the narrative and told him about the findings. He pulled a folder out from his briefcase, handing it to the President.

After listening for a few minutes and looking very closely at the photographs in the folder, he whistled and shook his head.

"It would appear that we are in deep you-know-what, gentlemen. Where most others would come to me with a sort of whining, 'What can we do, Sir?' attitude, I never have had anything other than the most direct and therefore helpful suggestions from the Swifts. So?"

Damon nudged Tom with his elbow.

"Oh. Well, Sir, the small planet in question sits in an eccentric orbit about as far outside that of Pluto's as Mars does from the Earth. In other words, too far for any earthbound telescopes to detect. That also puts it beyond the ability to send a manned mission out to see what is really happening. Even with our super telescope the distance obscures so much that we are playing a guessing game. One in which we know a lot, but cannot know everything. Now, there are several courses of action we might take."

He outlined the "Wait and see" one and said it was the one most likely to get them into the worst trouble. Next, he suggested immediately sending the current fleet of three dozen of the mules farther out into space to wait to intercept anything coming in.

"The problem with that arises in the lack of planets against which to push. Saturn and Jupiter, the two we can get the mules out to in time, will be far enough along their orbits so as to be useless. And, Mars and the Earth are too far away. What we might do is to try to build a temporary planet substitute."

His father's head whipped around and he stared at Tom. It was a concept that had only just come to the young inventor's mind.

“I’ll try to explain that. You see, in the asteroid belt are thousands of pieces of what was almost certainly once a forming planet. It even had a moon, the object we call Ceres. Ceres is too round and regular to have been once a chunk of planet, but the total mass of what else is out there would have made a planet about thirty percent larger than the Earth. As it happens, the bulk of the largest pieces are coming around and into position where they might be, well, herded into a large formation where their total mass would cause them to try to stick together. We might assist that with some sort of… something. Call is space glue but that’s not at all right. I’m not doing this too well but it only just came to me. Anyway,” he continued seeing the three other men were looking intently at him, “we’ll have to do a lot of calculations, but we might be able to coax enough of them together to give the mules a base to shove against.”

The President was nodding but he looked concerned. “What happens if you cannot get enough mass, or if you do and it works but you have this huge thing out there. Can it be considered to be absolutely safe?”

Tom shook his head. “We don’t know, Sir. I don’t know. I’m sorry to be so unprepared and unhelpful.”

“Not at all, it is just that if I agree to any course of action I have to be able to assure the world I’m not opening another bad door to even worse possibilities in the future. Do you understand that?”

Tom gulped. “Yes, Sir, I do.”

CHAPTER 5 /

CAN YOU DRAG RACE AT FTL?

IF NECESSITY was the Mother of Invention, then at the very least Tom Swift should be considered the super smart Older Brother of Invention. The one who actually outdid his sibling in almost every way.

Over the years since his first major endeavors had come to public notice, his work performed a balancing act between what was needed by company or by public acclamation and what he knew was going to be needed; if not right then, at least some day.

However, as he sat in his underground office trying to think through the multitude of things that would need to go into his audacious plan, he grew more and more convinced that it wasn't going to work! Unless… but then, he didn't believe in miracles.

He had nothing in his invention arsenal he felt could be repurposed other than the Attractatron, and that might not be the solution at all. The issue was that he would require one for each piece of asteroid that needed to interact together. Then, short of smashing them to pieces as things came together, they would need to remain powered, holding their individual chunk in place until the operation was finished.

Technically, this was not only feasible, it was downright possible; with one exception. One BIG exception.

Unless he captured Ceres to use as the core of his impromptu planet, it would be necessary to gather more than fifteen hundred of the largest chunks together to form the basis for his "push" platform against the incoming comet.

But, Ceres was not in the proper orbital orientation at present and would not be until several months too late.

Fifteen hundred chunks meant fifteen hundred separate Attractatrons. Fifteen hundred different power supplies. Fifteen hundred things to coordinate!

The alternative would be to bring them into close proximity, somehow cable them together and winch the entire thing in as tightly as possible. *That* would not be practical, but he could not discount it as a possibility.

Tom's head hurt from all the thinking he was forcing it to perform. He tried to recall when he had last taken an aspirin for

the pain, and realized that he had *not* and for many weeks; even though he kept getting up intending to find and take them, he kept getting sidetracked.

He stood up, wandered across the floor of the underground hangar and took the elevator to the ground level where he had to shield his eyes from the bright sun that only made the throbbing pain increase. From there he headed to the Dispensary and Doc Simpson.

"You look like a man with a ton of burning bricks stuffed in his head, skipper," the young medico told him seeing the pained look in his young boss' eyes. "Tell Doc."

In spite of the pain in his head Tom had to grin. The man knew him, literally, inside and out.

"I've got this horrible headache, Doc. It comes from another technical headache of the 'Can you pull a miracle out of a hat,' variety. The trouble is, I can't find the hat and aren't even certain what sort of miracle I ought to be trying to reach for."

Doc patted the exam table he kept in one corner of his office, and Tom climbed onto it. After checking the young man's heart rate, his blood pressure, breathing, sinuses and eyes, he next moved onto the throat, glands, reflexes and even had the inventor lay back while he pressed, rather roughly, over the inventor's liver. He could automatically rule out the appendix as that had come out after an accident five years earlier.

"Everything seems normal, at least without subjecting you to a battery of scans and invasive tests. I can give you some pills for the headache symptoms, but nothing for the cause. That, plus the usual, 'You need to take it easy and stop stressing over things,' pep talk is all I've got at the moment."

As he was pulling a large bottle from a locked cabinet and dispensing about a dozen of the oblong, green pills into a small vial, Tom buttoned up his shirt.

"Today it's my headache and probably dad's as well. I wonder why he is taking this so well?"

Doc chuckled as he handed the vial to his patient. "He isn't. You missed him and this same exam and bottle of pills by about ten minutes."

Tom knew that Greg "Doc" Simpson was a loyal employee as well as a good friend. He trusted the man with his life, so he asked if it was okay to unburden himself about what was going on.

"I'll treat is with the same doctor and patient confidentiality as usual, plus I guessing it falls smack dab in the middle of my employment contract's confidentiality clause. So, go ahead."

After being given all the known facts and hearing Tom's frustration over coming up with an adequate and achievable solution he shook his head.

"Way out of my league, skipper. I'll tell you what, though. Give me back my pills and I will trade them for a long-lasting injection that will keep the blood vessels in your brain from doing the things they do that cause headaches. It ought to last a week."

Tom nodded. "Side effects?"

"It's going to drop your blood pressure, which might not be a bad thing. You will not be able to run for up to the first three days, nor will you be able to exercise without getting dizzy. Walking is fine but stairs could be an enemy and make you fall over if you take them too quickly. Ditto too much hugging and kissing at home, or wherever you get from Bashalli!"

He grinned knowing that Tom and his young wife were demonstrative about their affections, even in public.

Tom grinned back, taking the hint. "You're going to have to write that sort of medical order up for Bash. I don't think she'll believe me, Doc."

The shot began working even before he left the office and the note in his shirt pocket was only going to be given to Bashalli that evening after he explained what was going on.

As soon as he returned to his desk in the large office Hank Sterling walked in with a question and a request.

"First, and don't get angry with anyone, but I overheard a rumor I need either explaining or quashing. Is it anywhere close to true that you want to head out of the solar system? And by that, I don't mean back through a wormhole?"

"Yes, it is true, and before you ask me why I have to tell you this is company top secret. National top secret as well, so I may have to look you in the eye and lie to you, Hank. Sorry."

The big Engineer nodded. "I suspected it might be something like that. So, what *can* you tell me… if anything?"

Tom had to think for a moment before answering. "Okay. Again, this is secret so it doesn't leave this office. It is *no* secret that we have taken up the completely rebuilt Hubble telescope, now rechristened as the Callippus, to test it in space before

delivering it to the new station. And, it will come as no surprise that it is being thoroughly tested each and every second of the time it is up there which, by the way, was supposed to end a day ago but hasn't."

"Anything to tell about why it hasn't come back down?"

Tom nodded. "Without telling you exactly what, I can say that they have found one of the possible planets that have been theorized as being outside of Pluto's orbital path."

Hank's mouth made an "O" as he nodded. "Neat. So, that brings me to my request. Can I come along?"

Tom laughed. "Of course you can, assuming that whatever I go in is roomier than the *Galaxy Traveller* and there is enough space for your six-foot five-inch behemoth of a body after Bud and I squeeze in." He looked at his friend and colleague. "Do you even care what you might be getting into?"

"Nope! I'm a trained astronaut, been involved in building the original Outpost and did some time up at the new station, and have been to the Moon and Mars, but most of the time when something big comes up I've got too much on my plate down here and so your father says, 'Sorry, but not this time, Hank.' I'm getting to think I'm not wanted up there." He pointed to the ceiling.

"Okay. And believe me when I tell you, you *are* wanted up there as well as down here! The only thing is I need to come up with a way for us to get out there. With nothing that far out we can count on for the repelatrons to push against I may need to rely on an ion drive."

Hank shook his head. "Even I know how long it takes one of those to get you up to any appreciable speed. I think the last time I checked, a trip to Jupiter would take about twenty percent longer than a repelatron one without trying to slow down, so something like triple that distance to this new place would be a killer. Everyone would celebrate at least one or even two birthdays on that round trip."

Teasingly, Tom asked, "What if we could travel faster than light?"

"It'd be the difference between taking an exceptionally slow moving tortoise down a quarter mile track versus a top fuel dragster. The only thing is, can you race a dragster faster than the speed of light? Or, build one for that matter?"

"There is the solar sail and high-powered laser approach that was tried a decade ago. They got something fairly small up to a

speed fast enough to get it shooting past Mars' orbit in a few days."

Hank nodded then shook his head. "As I recall, the acceleration was smooth and steady and all that, but the object they sent out was too small to have anything to use for braking. I'd hate to get flying at light speed only to continue on past our target and into the great infinite."

Tom gave a rueful chuckle. "To tell you the truth, big guy, I'd be content to just get down that particular track in a modest foreign subcompact. If I can figure out how to get a ship going at, oh, I don't know, maybe at even eighty percent light speed, then with acceleration and deceleration, that would take us… hmmm?"

Hank sat down and pulled out his tablet computer. Together they ran some numbers through their preferred calculation applications finally coming to a conclusion twenty minutes later.

"I've got seven days given constant 5-G acceleration with no coasting and the same for slowing down. You?" Hank asked.

"A day longer because I've factored in a couple hours of coasting every ten hours to let people recover. However, I know for a fact that Doc would never sanction that sort of reckless breakneck acceleration. No, Hank, I'm afraid I've got to come up with something entirely new."

It was the Engineer's turn for a rueful chuckle. "Right. Something nobody has ever been able to accomplish regarding something that is only theoretically possible but not at all probable. I'll come back in an hour once you've got that all figured out!"

He stood up, smiled down at Tom and left the office.

The inventor sat wondering when and how he would break the news to the people at Enterprises about the sort of stakes that might be involved in reaching the planet Eris and being able to do something to keep it from influencing the path of Haley's Comet.

He decided to seek some legal advice.

"I'll be up seeing Jackson Rimmer for a bit," he said to Trent as he left he office.

"Well, that will make you and your father. I'm not sure what they are discussing, but you might need to wait. Just so you know."

Tom thanked the secretary and headed down the hallway to the

stairs. He paused halfway up because Doc's shot was beginning to make him a little dizzy. Once on the third level landing he stopped again. What did he really want from the legal expert? Advice? Reassurance? And, would his father approve of him bringing up the subject?

With a shrug he left the stairwell and walked two doors down the hall.

"Good morning, Tom," the young woman at the front desk greeted him as he stepped into the outer office. "Your dad is in with Mr. Rimmer but left a message saying to let you in if and when you got here. Go right in."

Now more curious than ever, Tom lightly rapped on the door before opening it and stepping inside.

"I would ask what brings you up here, Tom," Jackson told him, "except your dad and I have been discussing the matter. Assuming, that is, this has to do with a certain planet and a comet and how never the two shall meet, at least in the good scenario..."

All Tom could do was stand there, open mouthed, for a moment.

"Well, yeah," he replied looking at his father. Damon, for his part, smiled innocently and patted the chair next to his.

"Jackson and I have been discussing legal ramifications of announcing things to he world. We agree that we need permission from the President, but we also agree we need to stress to him how vital it is to be as up front with the public and doing it as quickly as possible. What's on your mind?"

Tom gave a little chuckle. "About the same things. But, even before we tell the public, what and when do we tell our own people? I've already had to put off several questions about why the telescope was left up in space so long. Both from up at the new station and down here. Hank just came to see me asking about a rumor that he has heard making the rounds about something going on outside the solar system. He wants to be in on whatever it is, and it isn't fair to not tell prospective crew members what could be at stake."

He had leaned forward and now, seemingly deflated from his speech, he slumped back into the seat.

Rimmer steepled his fingers together and tapped the index fingers against his nose. When he finally dropped his hands back to the desk he said, "Damon tells me the President did not make an outright demand that we not say anything, just that we keep

things under out hat until the time was right. We need to call on our favorite Senatorial ally, the Honorable Peter Quintana, to back us on this, or tell us we're overstepping all boundaries, but I think the time is now right and all we need do is give the President a heads up that we are releasing information internally, but that it could slip out somehow, so he needs to let us make a worldwide announcement as well."

Damon had been nodding, but he now had a concerned look. "Why us and not an announcement coming from his office, Jackson?"

"That's easy. You've said before to me, right from that seat, that while you respect the office you have a certain level of distrust of the man in that office. Right?" Damon reluctantly nodded. "Fine. So do I. The real issue is that so do eighty-three percent of Americans. The man has a seventeen percent approval rating right now so anything this earth shattering—and boy do I regret *that* phrasing!—is most probably not going to be fully believed."

Now, Tom spoke. "Yeah, I can see that. If he says we are in for possible trouble, some people will think he has an ulterior motive, as in several unfriendly nations who might see it as an attempt to force terrible things like freedom and liberty on them. Then, others will hear him say things will be handled and they won't believe him because they think he is sugarcoating a cataclysm."

"Right. If he tells the world, it is not accepted for what it is. We tell the world and he stands behind us—he gets our allies in Europe and Asia to stand with him and behind us—and we keep the public in the know throughout the project. Then things might be seen as above board and in the best interest of everyone."

They talked about how there would always be a faction wanting to either profit from anything that might go wrong and others who would go into panic mode no matter what you tell them.

There would probably be no win-win situation, but it should be better to take the announcement out of the hands of the career politicians and put it in the hands of the scientific community.

Pete Quintana suggested they err on the conservative side of things.

"Give me five days… no, a week," he requested. "I need to work on our Commander in Chief to swing his mindset away

from what is best for his chances of reelection to what is best for people all around the world. Fortunately, he won't need to go in front of Congress to get permission for an announcement. That falls under his powers."

They agreed, not because of any political reason but because Tom and Damon could use the week to come up with something they might tell people could be done to keep any problem from occurring.

And, that was one of the problems. Neither man could come up with a definite plan of action.

"Unless we can go see what is really happening out that far, Dad, I don't see how we can be expected to say exactly what we are up against, or how we might overcome anything."

Damon nodded. "If, that is, there is anything to worry about," he said sagely. "There will be a public misperception, you know. Some people, and unfortunately they are the ones who seem to shout the loudest and get the most attention from the people who either can't be bothered to make their own decisions, or who have been brainwashed by the media into thinking that all problems ought to have an absolute and immediate solution that benefits their interests, will speak out!" He ended with a red face and anger in his eyes.

Tom was astonished. It was as near an outburst as his father had come recently. Cautiously he asked, "What happens if we just leave it up to the politicians to make the announcement and then sit back—working all the time to come up with something—until they and the public call on us?"

Damon grinned, but looked a little ashamed of his previous outburst.

"It isn't the Swift thing to do, but it might be our only hope to keep the public from half deifying us and half castigating us for whatever we announce or eventually do. I think," he said with a slightly resigned tone, "that may be our best hope. So, when Pete Quintana calls us in a week or so, let's try to have some plan of action in our minds, but not tell him."

Tom was curious. "Why?"

"For the simple reason that he would have to tell the President who would give the information to his spin doctors who would twist and turn it in such a way they believe will be palatable for the general public, or acceptable to our allies and enemies alike, so before you know it, everything has been changed. We tell him we will go out and look to see if it is

advisable or even possible to shove the comet out of the way and before you get home it will have turned into our rearranging the universe so that it will forever and a day be safe for all mankind except for our mortal enemies and anyone who hates puppies and kittens."

Tom agreed. "Just as long as it isn't, 'Tom Swift has sent Haley's Comet on a death spiral that will end in it crashing into the Earth!'"

His father rolled his eyes and nodded. "Right. So, I suppose that leaves us with about a week to think this thing through. I am leaving this in your lap, as it were. The one thing I might suggest is taking that reworked Hubble out beyond and behind the Moon to get it away from any sunlight or Earthlight influences and see if you can get any better pictures of what is going on with that planet. Obviously you cannot see the comet but we do have a fairly good historical track of its path."

Tom promised to do so, but asked if Mr. Swift thought a crew without his being there could do the job.

"If I go now, then I will be spending a lot of time on that instead of thinking and planning."

"It's a good idea. I would believe that Red Jones and Zimby and a couple techs, maybe even Bob Jeffers as the astronomy expert, could do that over a two or three day period. Ask them."

Within the next hour Tom had arranged for a seven-man crew to head out for Fearing Island that evening. The Callippus telescope had not been brought back down yet, and could be reloaded onto the cargo deck of the *Goliath* and arrive beyond the Moon within a few additional hours.

"We'll get the best look at things possible, skipper," Bob promised when he arrived at Enterprises that afternoon. "I love the idea of getting rid of the final light influences from behind the telescope. I just wish there was some way to not need to deal with all that starlight behind Eris. Right now, because of our position in orbit, there are not one but three galaxies out there we'll need to discount."

Tom asked if there was something he might do to help. Bob smiled. "I'm making it sound worse that it is. Tom. Actually, we'll get fantastic shots. I only hope they help you."

So do I, the inventor thought. *So do I!*

CHAPTER 6 /

FASTER-THAN-PHYSICS

TOM AND BUD, and their wives, climbed into Tom's SE-11 "Toad" jet at five and taxied out to the easternmost south-to-north runway. The tower responded with a request for them to hold for a moment.

"Wonder what that's about?" Bud asked the others.

Tom was about to respond when the radio came back to life. "*Swift Two, Tower, We have a special hold request from Area Control up the hill. They are working with a Canadian heavy that's declared a 'mayday' situation. Please wait.*"

"Roger," Tom said and took his finger off the microphone button.

The four passengers looked up through the clear canopy and scanned the skies. Bud called out, "Wing over the East hills," and they all shifted their eyes in that direction. Sure enough, what would have been the right wing of a very large passenger jet could be seen at perhaps five thousand feet up. In seconds the rest of the jet became visible and they could see why the emergency had been declared.

Trailing from the left wing's outboard engine was a dirty line of smoke.

"Oh, goodness!" Bashalli exclaimed reaching over the seat to grip Tom's shoulders. "Will they crash?"

After watching a few more seconds, Tom responded with, "I don't think so. They seem to be under control and are heading for what is probably going to be a left turn and into one of the big airports down around Manhattan."

"But, why do they not land here?" she insisted.

Bud answered for Tom. "In a multi-engine jet when you have a fire you shut that engine down. That means you have more power available on the opposite side so you naturally have a better result if you turn in the direction of the bad engine. In their case that means heading about, oh, two-two-zero right now but in a few minutes they will add a little more power to the right-side engines and make a very slow turn and go into Kennedy or even Newark."

Before Bashalli could ask the obvious question, Sandy piped

up. “And, Bashi, they won’t want to try for here at Enterprises because that would mean making a very wide turn to get coming back in this direction. That would probably take them longer to get done and lined up properly than to just head south. Oh, look,” she said pointing as the jet began to disappear over the smaller jet’s wing. “They’re starting to turn now.”

Sure enough, the last thing they could see was the tail of the jet starting to move to the right. A few second later the radio announced they were clear for departure.

“Can you ask upper control if we should follow to observe?” He meant the tall control tower sitting on the hill above Enterprises that housed not only Enterprises long-range control room but an entire top floor run by the FAA for the control of the upper New England area.

“*They say negative, skipper,*” the controller told them a minute later as they lined up at the end of the runway. “*The heavy traffic reports they have full control and thank you for the offer. They got the fire out.*”

The Toad raced down the runway practically leaping into the air as the nose rotated upward only eleven hundred feet down the runway. Moments later they had passed over Lake Carlopa and were turning to the northwest for their destination of Oswego on the south shore of Lake Ontario.

The total flight time was only twenty minutes and Tom set the jet down without so much as a bump on the Oswego airport’s one and only runway situated about two miles from the downtown area, located on what had once been an unused country property near a small collection of shallow, dirty water known as Mud Pond, Enterprises had assisted the town in building its runway using Tom’s incredible asphalt revitalizing and laying machine. In this case, as it had once down in Australia, old highway chunks of asphalt had been brought to the site where the machine ground them, heated it, mixed in some fresh tar and strengthening fibers and laid it out in continuous runs.

Now, the airport handled about fifty private and small commercial flights a day.

And, because of their work, Enterprises had a permanent parking place where Tom taxied them before shutting thing off.

A fast taxi ride got them to the Tishamingo Tower near the waterfront and docks where they had reservations at a favorite restaurant specializing in Spanish and Portuguese dishes.

As they gave the hostess their names, a man at a nearby table stood up, walked right to them and picked Bashalli up in his arms. She squealed with delight.

"Jon!" she and Sandy said in unison as he set her down in favor of taking the blonde off Bud's arm.

After disentangling himself from her he shook both the men's hands. "Tom. Bud. Great to see you after all these years!" His voice boomed through the restaurant causing many heads to turn, but none of them cared.

"Hey. Let's get them to shove the next table over and you can join me, if that is okay. Don't want to spoil any private dinner."

Tom answered for them all. "No, Jon. That would be great. I've been meaning to find some time to call you. I have a new design for another control unit for your hydroplane, if you are still racing."

The hostess and a busboy slid the two tables together and soon everyone was seated with menus in front of them.

"Actually, Tom, I've stopped racing myself but I now am the proud owner of two boats and have hired a pair of incredible young drivers. You'll never guess but the boat with your first controller wins all the time, so I let the guys switch off."

"I can fix that," the inventor assured him.

They were so engrossed in talking it took three visits by their waitress before anyone could order, and then the conversation continued.

Before desserts were delivered, Tom leaned over to Jon and asked if they might have a private word. The two excused themselves and headed out of the restaurant and to an alcove near the elevators.

"Jon, the reason I wanted to talk to you involves something that is very confidential, and normally I would never break that, but you have a rather unique perspective on gaining speed. Heck. We wouldn't have come up with the final design for the QuieTurbine engines without your suggestions. I hope you are still happy with the licensing checks you've been getting."

Jon placed a large hand on the inventor's shoulder and squeezed it. "Tom. For starters I never expected any payment. It was just one man helping another. Certainly your amazing stability controller more than ought to have paid for it, so I have been banking your checks with an eye toward awarding our local school system with a grant to promote science and mathematics.

Any thoughts?"

Tom laughed. "You do that but let our Swift Charities know how much and they will add some to the pot! Now, to change the subject, I need some more advice."

He told the man in vague terms about a need to travel outside the solar system, and about the repelatron issues.

"Any words of advice from someone who obviously thinks along a different plane than I do?"

Jon thought a moment before finding a chair to sit on. He leaned forward. "Okay. I'm no scientist but I have a pretty decent grasp on physics. What you need I see as two-fold. First you have to have some way to travel very fast. Faster than physics would say you can travel I believe. Second, you have to have some way to stop. Have I boiled that down?"

Tom nodded.

"Fine. Then I have to go to fuel. That makes an incredible difference in my boats. Stronger fuels, those with more stored potential energy to exploit, end up making the boat go faster. I've read about ion drive and that seems to me to be a losing proposition. Too much fuel needed and too little acceleration. So, you need to find something that is as explosive as a nuclear reaction. Only safer. We all know what happened to that Russian experimental craft. Either that or find something to latch onto and let it drag you out there. Then, it's a simple matter of parking it so it waits to do your bidding, and then drags you back."

Tom was curious about something. "You say 'drag' and not propel. Any particular reason?"

"Well, I see pushing against gravity, like the sun's, sort of like pushing something up a hill. It is easier to drag it up than to push it. Better steering control as well."

They looked at each other for a moment. Finally, Jon stood up, saying, "Sorry if I can't be any help on this. I was kind of hoping to parlay this into an invitation to go into space with you someday. It's been a little dream of mine for years." He sighed.

Tom reached out and touched his forearm. "It can happen. You would need to come over to Shopton for a few days and get the going over by our doctor, then spend some time in our zero-G simulator tank and finally take a short hop up to our outpost. Or, perhaps to our new super station." They looked at each other again before Tom added, "I need to go to the new station in four days."

The other man's eyes lit up like a kid at Christmas.

"Give me through tomorrow to arrange things here and I can be in Shopton on Thursday. Will that work?"

The inventor didn't answer, but he did head back into the restaurant and their tables with Jon at his heels.

"Allow me to introduce you three to the newest astronaut candidate of the Swift companies," he announced.

The girls practically squealed with delight while Bud shook Jon's hand. "Boy, oh boy, am I ever gonna have fun training you, Jon. Jetz!"

The desserts arrived and all five dug in with renewed vigor.

Jon arrived the next late afternoon and after meeting with Tom for a half hour was taken to Tom and Bashalli's house by one of Enterprises' secretaries.

"Why, hello, Millie. Hello, Jon," Bashalli greeted them. Little Bart was in her arms and apparently was finding several strands of her hair to be a tasty treat.

"I'll leave this hunk in your capable hands, Bashalli," the secretary told her and headed back to her car.

The next two days were a whirlwind for Jon Wolff. Never before, other than Army Basic Training, had he worked out, been examined so minutely, and subjected to so many strange new things. But, he passed the physical with flying colors—unsurprising since the U.S. Hydroplane Racing League insisted on stringent physical exams every year, as tough as any airline pilot had to pass.

His trip up on Sunday was to come along so Tom could bring the new telescope back down.

All the time they were traveling Jon kept looking around the expansive control room of the *Goliath* and mumbling about how huge it was.

"I always thought space ships were cramped. This is like my whole house!"

As soon as everything was strapped down, Tom headed them for the new Space station. It had been decided to go ahead and set it up now, rather than taking it to Enterprises and then back up.

As the crew of the station was maneuvering over the huge tube along with its solar array, Tom and Jon were floating around inside the hub area of the station.

Jon was jokingly asking if Tom would arrange some retail space so he might put one of his stores to sell clothing, snack items and mini-stars and black holes up there when Tom stopped and almost froze.

"What? You okay?" Jon asked, now worried.

Over the radio came Bud's voice. "Is the skipper just staring into space making you think he's having some sort of seizure?"

"Yes. What's going on? Do I need to call for help?"

He received a laugh in response. "No. He is off in a mental place I call Inventorville. Just drag him back to the elevator platform and hook his belt to the railing. He'll be like that for anywhere from five minutes to a couple hours. We'll have lunch and then check on him."

* * * * *

"I think I may have found the way to get a spaceship to travel faster than light," Tom said sitting down, looking at his father on Monday morning.

His father stared at the young man for a full minute trying to determine if this were some sort of joke. Deciding otherwise, he said, "I was going to ask how your trip was and how Mr. Wolff did, but I'm intrigued. Tell me more. Tell me how you push a ship forward at a speed that, assuming we believe Einstein and Hawking, can't go that fast."

Tom grinned. "We don't!"

Damon sat forward, staring into his son's blue eyes. Like his they twinkled whenever he was happy. "Fine. I'll bite. What does that mean?"

"We do not push the starship, or spaceship or whatever we call it, to get to our destination—"

"Oh. Is this going back to the process of prying open one of those thousands or millions of tiny wormholes, slipping your ship inside it, and popping out at some distant point? I seem to recall you had to look into quite a few to find anything worth investigating and even then you had no specific destination in mind other than an entire solar system."

Tom shook his head. "No. Besides, we've never found one of those that comes out anywhere less than a couple light years out. What I need to go out to explore, our new potential planet, is ten light hours away. So, sneaking along a hidden passage isn't the solution. What I have in mind involves no forward propulsion at all. We drag the ship."

Damon Swift looked at his son to see if there was going to be laughter or some other indication this was a joke. Nothing came.

"Drag?"

"Yes. Do you recall a book you once had me read when I was, oh, about twelve? I think the author was named Reg Bretnor. His character was an old coo-coo clock maker who gets abducted by a spaceship full of women and taken to their planet." He watched to see if there was some recognition.

"Anyway, that ship was pulled along at faster than light speeds."

"Yes… I very vaguely recall something along those lines. Remind me how that worked."

"Okay. And, remember, I'm thinking back to something I read eleven or twelve years ago, but that ship had two enormously powerful beings in it. The female was kept inside an energy bubble that was held in place out in front of the main ship. The male was inside, and as he tried to get to her—" Tom blushed as he recalled just *why* the male wanted to get to the female, "—his strength moved the ship forward. I suppose you could say he drove it forward, but it was the placement and fact of the female in front that pulled things along."

Damon laughed. "Okay, now I remember that story. And I suppose they steered by moving the energy bubble containing the female from side to side and up and down a little."

"Right. So, the more he wanted to get to her, the faster they went. To speed up I think they moved her bubble closer to the ship and to slow down they moved her farther away so he would give up a little."

Mr. Swift thought about this a moment. "Okay. Good enough for science fiction but how does it translate into reality? Your wormhole method made a lot of authors happy that you proved what the physicists said was crazy. By comparison this sounds bonkers to me."

"Bob Jeffers and I've found something that has a lot of pull. A black hole. As long as I can put it in front of my spaceship and let it try to drag it in, all the while keeping the right distance, I believe I can pull my ship. Since material traveling into the hole eventually goes faster than light I have computed that it can pull a ship at nearly those same incredible speeds."

"Tom," his father said looking serious, "this is physics. There is only so much you can bend things to your will and those are few and far between. Besides, it goes against all physical rules to

think something can hold both its own power supply and its drive mechanism out in front."

Tom shook his head. "I want to show you something that puts that theory to bed." He moved to his computer and did a search for a specific video. "Come take a look. This," he explained as he started the video, "is from a TV show a number of years ago. They debunked myths and theories. The one in this video they attacked said that you can't put a fan in the middle of a sailboat, have it blow into the sail, and drive the boat forward."

"Right. One of the small tendrils of the conservation of motion." As he watched the show's hosts set a small gasoline engine in the boat with the blade assembly from a large office fan attached. As the engine revved up the fan spun and the sail in front billowed out. Within a few seconds it was obvious that the boat was indeed traveling forward.

"Well, I'll be! That is certainly eye opening, assuming that it was actually happening like that. No trickery or anything."

"I'm certain the show boasted how it was open to proving and disproving any theory or myth. They didn't care. It was the pursuit of the truth they enjoyed."

Damon Swift rubbed his jaw. It was a sign of deep thought in both father and son.

"You honestly believe this has some application in space drives?"

"I do. I'll need to prove it, but the Observatory has been watching the area to make certain that nothing might harm any of the asteroids we want to mine. They found a black hole hiding behind about eleven larger chunks of rock out there. It is perhaps about a meter in diameter, not the size of ones that supposedly swallow planet whole, and I think I can harness it!"

"Hmmm. If it is powerful enough for that, why doesn't it pull in the asteroids?"

Tom grinned. "They are too far away. The closest of the large chunks is nearly a quarter million miles away. It could be it already cleared the neighborhood millennia ago. All I have to do is go out there to see for myself."

Damon thought about this a moment. "Okay, but let's say, for a moment, that this works. What about the people inside? If you suddenly find yourself at super high speed, what about inertia?"

"Are you referring to the possibility of anybody inside getting squished into a puddle?" Tom asked with a slight grin. "Because

if you are then I believe I have an answer."

"Go on…"

Tom took a breath and nodded. "Okay, If the ship is being dragged along at, let's say the speed of light, and it is pushing the black mass ahead at that same speed, shouldn't the same forces dragging the ship effect everything inside?"

Now, Damon's eyebrows rose. A smile came to his face. "Ah. I see. Everything is being affected at the same rate and so there is no inertia to worry about? If that's the case, then you've hit on a brilliant means of getting ships up to at least the speed of light!"

Tom nodded. "Right. So, it would take just about five and a half hours to reach the new planet location. That is, if we were immediately at speed and didn't need to stop."

"I see, and I agree with your math. But, tell me, how *will* you stop?"

Tom smiled broadly. "That's easy. We just swing things around so the black hole is facing back the way we came and let it naturally slow us. In actuality I'm willing to bet it will take a few days each way."

Damon shook his head. "You realize there are dozens, perhaps hundreds of factors that you need to take into consideration, don't you?" Tom nodded. "I see. Okay. Let us say that you have this black hole in mind. Let us also say that you actually can grasp onto it. How fast do you believe you will accelerate and then decelerate?"

Now, Tom shook his head. "I've done some of the math and some computer simulations. So far all I can say is that it will most likely require at least forty hours to get up to near light speed. I don't believe we can crack that barrier so let's assume point-nine-five of light. In the two days it takes to get going that fast, we will get past the orbit of Neptune. We travel at speed for one hour then begin the slowdown process. The trip would be eighty one hours start to finish."

"And, once you arrive? What then? What do you do with your black hole?"

"I haven't gotten that far into the thought process, Dad. I had a notion to just put it in the way of the comet and let nature or physics take their course, but the hole I believe I can locate isn't massive enough to do much. And, nobody knows what happens if you hit a black hole in the mouth with something it can't swallow!"

They agreed there were far too many obstacles in the way at present, but Mr. Swift couldn't, in good faith, say that the plan was not going to work. He did have one other question.

"The ship I imagine you envision building on out at Fearing Island… far away from prying eyes of the press and public, is it going to do what you need for this ambitious trip you are trying to plan?"

The younger man's shoulders slumped. "Probably not," he admitted. "I likely need to carrying capacity of the *Goliath*, but then the black hole I would need would have to be twelve or fourteen times more massive. That I am not certain I can control!"

"I see. Can any ship carry enough fuel to get you there and back?"

"No. Not on its own. Even in the form of nuclear power pods or a full-fledged reactor. But, I wonder if I plan the trip to take a lot longer if I could seed replacement pods along the way? I keep the cluster of three at the back of the ship, and those will get us about fifty hours of travel. So…" and they began discussing what it might take to accelerate and slow down over a cycle of five times to get them out to the site.

It would mean the four-plus day trip would take nearly twenty days, but it had the advantage of actually being workable. Power Pods expended would be left in place where they would regenerate to full capabilities in about four days. By the time Tom returned they would be ready to go. Plus, if he sent them out soon, the *Goliath* could be in a position to pick up the expended pods—at least the ones inside Neptune's orbit—when the time came to retrieve them.

Neither inventor felt comfortable with the idea of abandoning them in deep space. There might be no telling what could happen if they were ever to crash onto one of the planets or even be captured by unfriendly forces.

CHAPTER 7 /

DESIGNING THE *TRANSPACE DART*

BY THE time Tom returned to his small underground office his mind was racing with possibilities. He already had discounted *Goliath* or anything like that massive ship from consideration for the possible flight.

Ditto, to a lesser degree, the *Sutter*, his cone-shaped, golden mining and multi-function ship. While that vessel was purpose built to have replaceable drive units, to date neither the large repelatron array nor the ion drive units had been able to achieve anywhere close to the required speeds. The one thing in *Sutter's* favor was the massive storage compartment in the front ninety percent of the ship.

The mining and refining core used several times each year to pulverize, mine and extract minerals and metals—including very valuable rare earth elements, the sale of which brought nearly a half-billion dollars per year into the Enterprises' budget—could be eased out and placed in holding orbit nearby the Outpost and its geosynchronous orbit position. Then, multiple inflatable bladders could be inserted and connected to provide storage space for which fuel the ion-type drives might benefit most from using.

Except, as had been noted, that type of drive would still require the best part of a year to get the ship to full speed and then the same period of time to slow them down, arriving at their destination far too late to do anything.

That, in Tom's mind, was okay as he was still of the opinion that his wild plan of harnessing a black hole as their means of propulsion could work.

It would, however, require a very special balance of ship, power, and computer control.

That, he sighed to himself, meant starting back at the beginning—the ship, and function before form.

In Tom's mind the new ship was not destined to be anything but a totally functional spacecraft. Most probably it was not to become an object of both beauty and of the sort science fiction writers tend to come up with. As Tom periodically did, he sat at his old-fashioned drafting table, a set of colored pencils next to his right wrist, and a short stack of blank drafting sheets on a

shelf to his left.

Already in a messy *almost* pile near the top of the board and to his left were eleven sketches. These ranged from a large sphere that featured a bulging ring for whatever type of drive mechanism he came up with, all the way to one that was basically an enlarged version of his *Galaxy Traveler*, the ship in which he and Bud first traveled through a wormhole into another solar system.

In the recycle box at his feet were nearly twenty discarded designs, or missteps, as he preferred to call them. A few were fanciful while others were downright ugly and had been the result of frustration. None of them would ever be reclaimed as possibilities and by tomorrow they would be shredded—pulverized in the company's paper grinder, or The Big Muncher as Bud called it. That turned anything into a powdery dust that was baled in vacuumed bags and shipped to a paper mill in Albany for use in creating recycled writing paper Enterprises bought back for reuse.

The drawing currently in front of him was starting to look more like a metal Christmas Tree with bulbs at the lower edges of the four fins than it did a ship capable of traveling through space, but it was intriguing to him. As he had pictured it while driving into work that morning, if seen from above it would look like a giant letter X. Seen from the side—the view he was working on at present—it tapered from a slightly blunted point at the front end down to four very wide fin-like structures.

What made it seem slightly absurd to the casual viewer were those four large balls, one at the endpoint of each of the four "fins." He was looking at this when he heard the elevator bell across the hangar floor *ding*, followed by the familiar footsteps of Bud.

"Knock, knock," the flyer announced himself at the door. "I just had my annual physical with Doc. Boy, is he ever getting thorough. I'll bet he listened to anything and everything in my body that could possibly make any sort of noise, and then he poked and prodded me until I'm going to have to explain a few of those bruises to Sandy tonight. He had me sit in that combination water bath and Italian one-man car thing of his. For thirty minutes, no less!"

The "thing" was a body mass index measuring device that also tested the subject's skin for permeability. Totally computer operated, once the individual, or Bud in this case, stepped inside and sat down—naked underneath a modesty towel—that towel was handed back out and the hatch closed. Air was pumped in to

a level of eighteen pounds per square inch, higher than air pressure at sea level, and water flooded in at precisely the person's body temperature until it came to a point halfway up his or her throat.

Over the thirty minute run time, the machine calculated to the nearest hundredth of a percent the amount of body fat the person carried while sonic waves measured precisely where on and in the body it was stored. Then, and this was what fascinated Bud enough to put up with the process, after drying him with warm air jets, it measured his weight to see how much more it was than before subjected to the water.

Where most people picked up about three ounces of water through their skin, anyone with one of four known diseases would either gain significantly more, or none at all.

Bud passed with a respectable three point two seven ounces of absorbed moisture.

"What does that tank tell him?" Tom asked. His exam was scheduled for the following morning and he had never been in the water-filled device.

"Doc says it is an indicator of overall body health, plus for those of us who regularly go into zero-G or sub-Earth gravity he says it can tell if we have had cellular damage that might cause troubles later in life." Bud looked at his friend and sighed. "I might as well tell you that Doc is worried about you and the skin damage you took up at the outpost when your suit was torn and your back was exposed to space."

Tom nodded. A few years earlier he almost lost his life just outside the Outpost in Space when a small meteor fragment heading for Earth hit him right in the backpack. The impact had ripped the backpack off his suit and had torn a gaping rent in the suit itself. He completely depressurized and would have died had it not been for the fast reaction of several others out with him. He sustained major lung and skin damage and his recovery had been painful, but the experience led him to design the special one-man recovery pods that were now standard equipment at the Outpost. They could take an injured crew person back to Earth and land them at a hospital in under two hours even when no other ship was there.

Twice now they had served their purpose and both men had recovered from major injuries that would never have been treatable at the Outpost.

Bud stepped over to look at what his friend had on the drawing board. "Hey, you going in for holiday decoration

design? Christmas is many months away, you know."

"Ha-ha, Bud." Tom explained what he was trying to come up with before pointing back at the current design.

"I'm picturing this as being about two hundred feet tall and about eighty feet wide at the bottom. Those balls," he said tapping one of them with his pencil, "will house nuclear power generators. I'm thinking of repurposing the ones we took up on the *Goliath's* deck earlier this year. They ought to give us enough power for just about any need."

"And, that need is—?"

Tom told him he intended to take a trip outside the orbit of Pluto to explore at least one of the distant, or exo-planets. He did not elaborate as to why and Bud did not ask.

"Hmmmm. Kind of looks like that monster hotel North Korea built at the turn of the century that never worked. They tore that down last year as I recall. Anyway, how does she fly?"

Tom sat back, shaking his head. "Right now, my inquisitive friend, I have zero idea. I could mount a large repelatron dish at the back and that would be sufficient for pushing us on the way out—although the trip I have in mind would take a couple months because we would have to coast all the way out from about the asteroid's orbit since that is the last mass in any sort of position to help us right now. The problem arises on trying to stop, and then again on what to use to push against to get us back home."

"Oh. As in if all the planets are around the corner, so to speak, on their orbital paths, then we need to be certain we have something else out there to hit with the old repel-o-tom beams, huh?"

Tom chuckled. "Something like that. Another course of action might be to also take up huge spheres of fuel and make the drive unit an ion drive."

"Or, both?"

Tom considered this a moment. "Sure. Or, both. Use the repelatron to get up a good speed for the trip out and then flip over to use the ion drive to stop where we need to. Then, if there isn't a good planetary body out there we simply use the ion drive to head home with and pick up speed using the repelatrons again when we get closer in."

"So," Bud said with a hint of mischief in his voice, "what are you going to call that inter-planetary space dart?"

Tom looked at the design before answering. “The Swift Interplanetary Space Dart, I guess.”

Bud shook his head. “Not catchy enough. It needs something else. Something that speaks of speed and the fact that it looks like a large metal Christmas tree. How about the Swift Holiday Express? Tom's TranSpace Lawn Dart? The Swift Space Pyramid?”

Tom said nothing for half a minute. “Did you come down here for anything in particular, Bud? Or, helpful?”

“What? Oh, no. Not really. Just wanted to tell you that Doc gave me the clean bill of health for another year of heading into danger with my best buddy.”

“Good. So, before I suggest that we go grab a bite to eat, want me to show you the other drawings I’ve come up with?”

“Well of course. But, you do know that this one,” now he tapped the drawing on the board, “is going to fester in your mind until you start asking people’s opinions and then they will tell you that is their first choice. Right?”

Tom chuckled. It often happened that the one design he spent the most time explaining to people like Bud ended up being at least the basis for his final design.

When he started going through the other drawings, Bud’s eyes widened at the sight of the sphere.

“How big is that one?”

“Uhh, probably about a hundred feet in diameter. Perhaps one-fifty. Why?”

The flyer grinned. “It reminds me of the ships from an old sci-fi space opera book series from Germany. The good aliens had spherical ships while the bad aliens, generally something like space-faring lizards or trolls, had ships that looked like giant spikes or space bones. Anyway, it is kind of intriguing to me, that’s all. Lots of internal space.”

None of the others were very intriguing to Bud and he soon suggested they head up and take a walk to go get some food.

At lunch in the company cafeteria they discussed the very basic reasons for trying to go outside the solar system, or as Tom reminded Bud, “The *known* solar system. Assuming all these exo-planets truly have orbits around the sun, no matter how eccentric or how long they take, they are still part of the solar system twice as large as we previously thought.”

“Okay, but why does Tom Swift, and his faithful companion,

the intrepid Budworth Barclay, want to go all the way out there?"

Tom lowered his voice because there were several people sitting at the next table. "We'll need to head back to my lab before I explain. Okay?"

"Sure."

The subject changed to a proposed date night with the Swifts and the Barclays. Before they finished their meals it was decided to take the ladies to dinner at a restaurant they both favored over in Oswego near the marina.

When they arrived back in the underground office, Tom told Bud to take a seat. "I'll try to explain this, but you have to keep it so far under your hat that not even Sandy or Bash ever hear about it. Ditto mom. In fact, it only gets mentioned in here or in the big office and only if it is just us and dad. Okay? That's an order from the President of the U.S."

Bud nodded, wide-eyed in appreciation of the situation.

Once Tom laid out the issues with the planet Eris and probable close pass of Haley's Comet, and the potential for great problems should the comet's trajectory be altered in such a way that it put the Earth in peril, he gulped and could say nothing.

"That is why I have to get this ship built as quickly as possible. It will use a lot of off-the-shelf controls and components so we don't need to design much other than the hull from scratch."

"I do have one pretty important question, if you don't mind."

Tom shook his head. "No. Go ahead."

"What do you intend to do if we get out there and it looks bad? I mean, what *can* we do?"

The inventor sighed. This question had come to his mind more than a few times in the past week. The comet was not a small object, and was believed to be more a dirty snowball, but even with a moderately low weight, its moving mass as it passed the planet could be enough to destabilize Eris' position, and vice versa.

"Okay, Bud. First, the comet is sort of shaped like a giant peanut at about ten miles long and maybe five miles wide at the ends. Nobody knows exactly what it is made of, so nobody knows what might happen if we were to shove on one end and not the other. Could it break apart in the middle? Sure. What would happen then is anyone's guess. Instead of one known trajectory and roughly seventy-five year appearances, we could have two unstable chunks that would definitely be affected differently

than the single piece. One or both could plunge into the sun and that would be that."

"I sense an, 'Or...' in there."

"Yeah. Or, in an absolutely worst case scenario, one piece could head in for a death call on the Earth, or Mars... or who knows? We need to go out and assess the situation, but be prepared to take some strong action if necessary."

"Oh. I'm guessing we want to not need to blow the thing into tiny Haley's pieces, huh?"

"I'd prefer not to, Bud. I really would. It is, however, not beyond possibility. Let's say that the comet passes within, oh, five thousand miles of Eris. Bob Jeffers up at the Observatory tells me he believes that close pass would be enough to make Haley's course shift by as much as twenty degrees. As it stands today, the next two visits it will make on its trip around the sun would take it to within about thirteen million miles of Earth this next go around, and then out to fifty-two million the time after that. But, deflect it by as little as ten degrees in one direction—unfortunately the one most likely as it passes Eris—and the next pass bumps out to twenty-nine million miles but the one seventy-five-point-three years later could be within the Moon's orbit. Time things wrong and it hits the Moon or caroms off it into the Earth, or—"

"Stop! I get the idea. Bad times are a-comin' our way."

Tom shrugged. "Only maybe, Bud. But there is no way to tell until we get out there. The comet can't be seen until it passes within the orbital path of Neptune on the best of occasions, so everything is theoretical at this point."

"And the new Callippus telescope can't see it either?"

Tom shook his head. "No. If someone gets incredibly lucky, it might be visible inside Pluto's orbit as it comes in this next time, but the chances are slim until it gets close enough that solar winds start to make the tail appear."

Tom was about to say more but his phone buzzed. He pressed the intercom button. "Yes?"

"Tom, it's Trent. Your father would like to see you as soon as possible. Today's *Shopton Bulletin* just hit his desk and he's hitting the ceiling."

"Can I bring Bud?"

"As long as the two of you can peel your father off before he hurts himself, then yes. But, please hurry!"

The two young men rushed from the office and took the elevator to the ground level. From there they ran the five hundred yards to the Administration building, arriving slightly winded.

As they passed Trent's desk and into the office, he smiled. “Just to let you know, Jackson Rimmer just went in there. They are going to be calling the paper in a minute.”

“Thanks!”

Tom opened the door in time to catch his father saying, “... skin the son of a weasel alive!”

“Trent told us the paper has come. I can guess our old friend is up to his old tricks,” Tom said as he and Bud took seats in the conference area. Jackson Rimmer slid his copy of the paper over for them to read.

SWIFTS AT IT AGAIN!

NEW PLANET TO COME CRASHING INTO THE EARTH AT ANY MOMENT!

...said the headlines. The first paragraph under them read:

> Can it be? Our confidential source in Washington tells this editor the Swift organization has known about a rogue planet that is due to come slamming into us in the very near future, and they've known about it for years!

Tom looked over at the lawyer who rolled his eyes. “It would appear that Mr. Perkins can't play nice and needs another lesson in comportment,” the legal man stated.

Back at his desk Damon snorted and was about to say something when the office door opened and Trent stepped inside.

“Security is bringing a certain Mr. Daniel Perkins up to the office, he arrived at the front gate ten minutes ago and is supposedly in a real panic.”

Damon took a deep breath and blew it out before answering, “Good. As soon as he arrives put him in the seat across from you and stare at him for a good four or five minutes. I want him sweating profusely when we let him in here.”

Trent's mouth twitched, which was as close as he ever got to an actual smile over things such as this. “I'll buzz you when I

hear them coming down the hall."

"Only keep him out there two minutes, Trent, and then buzz us," Rimmer suggested. Damon nodded his agreement.

When the newspaperman was allowed in, he was in obvious distress. He nearly tripped coming in and blurted out, "I didn't do it! I swear!"

Rimmer stood and pointed to a seat across the low table from himself, Tom and Bud. Damon remained at his desk saying nothing. Perkins slid around the table and sat down.

"Now, perhaps you will tell us what this unscheduled and uninvited visit is about," Rimmer suggested. Just before Perkins arrived he had hidden the paper.

Dan's mouth gaped open like a distressed fish out of water. "Didn't—uh didn't you get today's paper?" he asked in a weak voice.

Rimmer stood so he could glare down on the man. "Of course we have! Now, before we call the judge to have you arrested, and have your paper closed down, explain!"

Dan Perkins poured out a woeful story. He had been out of town until about an hour earlier, leaving the duty of getting that day's issue out to his ex-wife's nephew, a young man he'd been forced to hire and despised at the best of times.

"I only saw the paper as one hit my desk. I have no idea who this source is or what my nephew is playing at, but I swear to you I would never have published that story."

Tom cleared his throat. "If our attorney will pardon me for saying this, but Dan, you have lied to us in the past. Why should we believe you? And, what are you going to do about that story?"

"On my way here I called back all the delivery trucks. About half of the papers were distributed to our paper carriers and a few of those had not delivered yet, so we have as many coming back as possible, and I have a retraction paper being sent to the presses in another hour. I just have to write the copy. I'll take full responsibility, retract the story and fire the little jerk. I'll try to squash the story as much as I can." He looked like a man about to faint when he stated, "It's all I can do at this point other than offer to shoot myself."

"Then, sit at my desk and write that retraction. Let Mr. Rimmer here read and okay it, and send it through. Then, prepare to call on every news agency you know of to make certain they know it was a phony article!"

Dan Perkins, a defeated man, nodded his head.

CHAPTER 8 /

HARNESSING A BLACK STALLION

AS THE two Swifts sat having coffee a few mornings later, Tom mentioned to Mr. Swift about his design for a spacecraft to use on the flight to Eris. Tom had scanned his favorite five designs into his tablet computer and showed them to his father.

Damon looked at them all before saying, “Number four. That stylized pyramid seems to offer the most flexibility to you, don’t you think?”

Tom grinned. As Bud had said, that design kept coming back into his mind to the point where he was starting to think of it as *the* design.

“Bud came up with a few suggestions for a name. Tell me what you think. The Swift Space Pyramid, the InterPlanet Christmas Tree, or the TranSpace Dart. Actually, he threw in ‘lawn’ in that last one but I’ve decided to take this more seriously. So?”

“That last name, I should think. Not that you are going to move from one physical space to another, except in the sense of proximity to our sun, but it has a better ring to it than, oh say, TransPlanet Dart. It certainly looks more like a hunting arrowhead than a dart, but then your *Star Spear* isn’t shaped like a star, neither was it meant to go to the stars. It is a stylistic thing. I’m just happy you didn’t take Bud up on the Christmas tree idea.”

Over the next three hours Tom carefully explained what he knew he needed and what he was uncertain of. For his part, Damon Swift listened, added a few comments, and tried to keep his personal opinions to a minimum. Finally Tom called him on that last one.

“Dad. Usually you have some pretty well though our opinions on things to tell me. I treasure those, so please tell me what’s on your mind about this.”

“Okay. I am a little overwhelmed by the idea of you attempting to harness a black hole. Now, I realize that you have stepped, willingly, into a time machine that could have killed you and that you have gone into and through a wormhole on several occasions. One time *that* almost killed you. Even then, you encountered something that might or might not have been a

black hole. And," he sighed, "I recall that on that first trip you actually may have entered that black hole or anomaly. Certainly nothing else can explain how you got back home without coming through the same wormhole you went into."

Tom and Bud had barely lived through that experience, but it had either been follow the beckoning ghostly hands that seemed intent on them entering the black hole—the one that periodically ran backwards!—moments before their air supply and ship's power both ran out, or perish.

And, yes, they had lived through the experience but had no recollection of what they had actually come through, at least not of that final trip.

"I know, Dad. I'm not suggesting that this is a slam dunk as Bud might call it, but assuming I can find a way to grab hold of the edge of the hole and control its position, I believe the science is as sound as possible without any real experience in this sort of thing. And," he smiled fondly at his father, "I *will* be careful. Promise!"

"Of course you will be. Tell me, though, how this design is going to function."

"Okay. At the nose will not be a point, but rather a concave area that will contain a powerful Attractatron emitter, a separate repelatron and an auxiliary ion jet motor. Ideally, I'd like to do everything using the repelatrons and Attractatron, but with not a lot of known things to use as a target for maneuvering I want that ion drive for moving the nose of the ship around to any new course."

He went on to describe how he believed the Attractatron would be able to find something within the outer rim of the black hole on which to grab.

"Once we find the right combination of things for the beam we should have it in a grip that cannot be shifted."

His father shook his head. "I am not so certain about that, Son. Everything we know, or at least assume we know about black holes tells us that the gravitational forces are far too great to even be measurable."

Tom nodded but he also had a slight grin on his face. "Right…" he said slowly, adding, "but what I am interested in resides just on the outer edge of the hole and not inside. In fact, if my theory about things proves out, I should find a solid ring of material that has backed up and cannot enter the hole itself. That is what defines the actual hole and I believe keeps it from

collapsing in on itself."

Damon looked at his son in amazement. "Do you mean to say that you believe the only way we ever see or experience a black hole is because it gets a... a... well, a *clog* of debris around the entrance?"

Again, Tom nodded. "I had Bob focus the new telescope on a phenomena they had previously located inside the asteroid belt. Something that appears to have a higher concentration of belt materials running in a near circular shape. I believe that is a small back hole that may have been out there for millennia and is too small to ingest much of anything. It still has the mass and the gravitational pull—at least within a limited area of influence—but it can't swallow what it finds any more."

He looked at his father. They shared a moment where both tried to outthink the other and decipher the other man's thoughts. Finally, Tom had to speak.

"If I am right and can grab onto that thing, all I'll need to do is drag it away from the asteroid belt and set it in front of my new ship. Black holes exist to eat space matter. I intend to offer it up the new ship and, like a carrot on a stick in front of a donkey, will use it to drag us out to Eris!"

* * * * *

Plans and preparations for outfitting *Goliath* for the trip to find the hole took five weeks. During that time the upper carrying deck was cleared of all but one of the large reactors that had once powered a particle accelerator. Now, it would power an array featuring one of the largest Attractatron dishes Tom had ever designed.

Where the dishes on the mules were about a foot across—incorporating an outer "pulling" element and the inner repelatron element that checked the makeup of whatever was being grabbed—the one he intended to use to grab the tiny black hole was a full twenty feet wide. It would be, he hoped, overkill on a grand scale, but it also did something no other Attractatron could do.

With a total of twelve mini dishes arranged around its perimeter, it could latch onto up to one dozen different molecular compounds at one time. It could space those beams around the edges of the black hole rather than attempting to grab everything, including the actual abyss of the inner hole area.

When launch day came, Tom—along with Bud, Zimby Cox,

Red Jones, Doc Simpson, Chow and Bob Jeffers, who had begged to come along both for old times sake as well as to make an astronomers' detailed observations—sent the giant lifting platform into the sky, slowly at first, heading out on a trip that would test not only the Arrayed Attractatron but also a new approach at overcoming the forces of acceleration.

Tom's artificial gravity invention—that used a full body undergarment interwoven with a special metal alloy thread in conjunction with tiny repelatrons in the ceiling needed the external garment—spread the pressing all over the body to give the impression of gravity.

It worked very well.

What he and Doc Simpson had been quietly working on was an inert, ingestible substance that could spread throughout the body into the various tissues that might work with a similar system to push exactly opposite from the direction of travel.

For a week everyone coming along had been drinking a special supplement infusing their tissues with microscopic particles of the new substance. Now, as Tom set the ship to begin accelerating at 2-Gs he turned the system on.

Like a near miracle the forces of acceleration seemed to disappear from them all. Doc checked each team member's vital signs on a monitor panel. Each man wore a series of sensors reporting to this central board.

It had looked good until the acceleration passed the 3G mark and Bud reported the bad headache coming on.

"It's worse than just the regular pressure from multi-G acceleration," he told the physician.

Doc asked Tom to put them in coast mode, and the headaches stopped.

Another test gave the same results, so that within the hour Doc requested a halt to using the electronic portion of the test.

"Sorry to report, skipper," he said to Tom, "but I'm afraid it's a bust. We can't get the particles to spread evenly everywhere in the tissues and the imbalance is going to cause problems if we use it any more."

Tom hoped the other part of their trip would not prove to be a failure as well!

* * * * *

With very little event horizon to be seen, if Tom hadn't maneuvered the ship within thirty miles it wouldn't be visible

against all the stars and small amounts of debris surrounding it. Now that he was closer he could see thousands of pieces of debris, probably only inches across, all around the completely black circle.

He remained baffled by the entire phenomenon of a supposed black hole. By all rights anything that massive would not just have ingress at the top with a steady stream of materials flowing along a plane and then spiraling down into it. If science was correct, these were born from massive stars that collapsed in on themselves becoming so dense and heavy with their own mass, yet all in a fraction of the size they were when a burning sun. They ought to be ball-shaped. Round.

If that were the true case, then surely they would draw materials in with their gravitational field at every conceivable point around their sphere. Wouldn't they?

Like the time phenomenon he had retrieved from the solar system he reached by traveling through a handy wormhole, he wondered if this "black hole" in front of the ship was only a partial projection from an alternate universe. That time-interfering bright spot had ended up being about the size of a basketball, had nearly zero mass and the same exceptionally low gravity. He had considered it might be a "tip of the solar iceberg" thing where the main body of the anomaly was elsewhere and just a fraction intruded in our universe.

And, perhaps this was the case with black holes.

No matter, what he intended to do was exceptionally radical and was going to require that his calculations of the ability of his new super Attractatron be absolutely correct. If not—

Tom didn't want to consider what might happen if he had made an error.

The good thing was that all measurements told him that while it had an incredible gravitational force around it, because the visible hole was only a meter or so across, that gravity quickly petered out so that at a distance of just two miles it had nearly no influence over the ship.

Tom launched a small probe to measure the forces of the black hole. Rather than send it out under some sort of propulsion he decided to just release it and see how long it took to finally disappear—if that is what it was going to do.

For the first twenty minutes the one-foot-square box drifted away from *Goliath*. As it reached the twenty-five percent point it began to speed up going from a slow two feet per second on release to nearly two hundred feet per second. And, the closer it

got the faster it traveled until the high-speed camera from his SuperSight equipment displayed the final, crushing second of the probe's existence.

And, crushing was the best descriptor Tom could find. One second it was a box, a split second later it was crumpling in on itself and another fraction of a second later it collapsed in on itself and disappeared.

Tom had moved *Goliath* to the side in hopes of seeing if anything came out the other side of the hole. All they saw was a nearly identical hole from each angle.

The only thing he could think was that the gravitational pull of the black hole made it impossible to detect any third dimension to it. For all intents, and no matter at what angle it was viewed, the hole was a two-dimensional object in space.

That would explain the idea of an event horizon that could be observed, but it did not explain why that horizon seemed to be a flat plane. It should be impossible to see a singular plane from any angle without being able to see other planes. He added that to his growing list of things to try to come to terms with.

Over the years it had become an incredibly long list.

To the amusement of those watching closely, the final thing the probe cube did was to swing around in a tight circle almost as if it were disappearing down the drain of a bathtub.

The information that had come back regarding the gravity from the hole stopped before it fully entered, but had climbed nearly exponentially during the final seventeen hundred feet. It went from barely registering at the point of release to what seemed to equate to six-Gs at the halfway point. The final reading just eleven feet out had spiked at an incredible ninety-two gravities!

Bud, looking over Tom's right shoulder, let out a whistle as that figure came up on the monitor.

"Can that be right?" he asked.

"Yes. And more. My guess is that at the actual entrance plane of the hole it would have shows a doubling of that level. Too bad the probe didn't survive longer."

"What now?" Red asked.

"Now, we fire up the reactor, get the Array Attractatron lined up and see if we can snag us a tiny black hole!"

Because there had been no way in which to gather the necessary gravitational information from Earth, Tom now had to

go through the process of number crunching and deciding on both the best distance to be from the hole and the amount of force to exert in their attempt to capture it.

There was nothing he might reference and nothing he could use as an absolute, so much of his work was based on assumptions.

For one, he assumed that once it had been captured, the black hole would not come racing in at them and hit the ship. If it did, there was no telling what might happen, although he guessed it would be quick and absolute.

Also on Tom's list of assumptions was that his theory of finding something both tangible and recognizable at the edges of the hole was correct. Without that there would likely be no capture and therefore no attempted use of the black hole for his planned travel past Pluto's orbit.

What with the negative results from the acceleration dampening system test, it was imperative that he find some way to travel quickly. Otherwise it was destined to be a trip of more than a year and that was more than he wanted to contemplate. Besides, Bashalli would put her foot down. It wasn't as if he could just select a group of others to go do whatever was required. Nobody knew what that would be and he was best suited for making those kinds of decisions as well as being able to act on them but only if out there.

Zimby wandered over with a hot cup of coffee for him. Taking it he suddenly realized how tired he really was. When he mentioned it, the pilot laughed.

"Well, duh! You've been at your calculating stuff for about fifteen hours! I've already taken my entire sleep period, as have nearly everyone other than Bud."

After he took a sip of the steaming beverage, Tom sighed. "I'm not getting anywhere with this right now and it's probably because I'm bushed." He stood up. "I think I'll take my sleep break now. Where's Bud?"

Zimby turned and let out a laugh. "Well, I was going to say he's sitting over there," he said nodding in the direction behind Tom, "but he's taking a little nap right now."

Tom turned to see his friend slumped in his seat, head leaning back and his mouth gaping open. "Okay, help me get him to his cabin and we'll both be doing the sleepy things. Oh, and thanks, Zim."

Tom woke, stretched and looked at the clock on his cabin

wall. It showed that it was two hours later. He rubbed his eyes and looked again. Surely it hadn't been only that short a sleep break. He had been exhausted and now he felt fine.

He washed his face using one of the recyclable cleansing cloths and pulled on his trousers and a clean shirt.

On entering the control room he was surprised to find that Zimby Cox was not in the controls seat. When he asked Doc, who was in the seat, the physician laughed.

"Did you expect Zimby to be here fourteen hours later, Tom?"

"What? I slept fourteen hours?"

Doc and Red Jones, who had just walked over to retake the seat after a fast bathroom break, both chuckled. "Yeah, skipper. When you went off to bed it was nine in the ship's evening and now it is eleven-seventeen the next morning."

Tom sat back down at this computing station and was about to get back into his work when the aromas of eggs and pancakes assailed his nostrils. His mouth began to water and he realized that he was very, very hungry,

"Come 'n get it, son," Chow's voice called out from his small kitchen set into the wall halfway around the control room. The inventor stood back up and walked across the circular room and into the kitchen. "Hope yer hungry, 'cause I got ya a double portion!"

Tom grinned. "I am hungry, Chow and can think of no better way to satisfy that than with some of your cooking."

He backed out of the small room and touched a button on the nearby wall. A table with 2-man bench seat flipped up from the wall and locked into place.

Eleven minutes later and with a full stomach, he got back up, burped, and went back to take up his work leaving a happy cook behind. Chow loved it when dishes were practically licked clean.

With his energies renewed, Tom was able to finish his calculations and a pair of computer simulations two hours later.

It took him an additional three hours to get everything into the maneuvering computers and to set up for the first attempted capture. His intention was to see if the hole would cooperate by letting itself be grabbed onto but nothing else. Tom wanted to take numerous measurements and to see if the hole might take exception to being grasped.

When Bud heard this he broke into howls of laughter.

“You really think that black hole might be bothered by something touching it on the shoulder?”

Tom shrugged. “I know that sounds ridiculous but you and I have both seen another, bigger black hole running backwards and with a pair of gigantic ghost hands hovering over it motioning us to come ahead and dive right in. Nothing about one of these is going to surprise me, Bud. Nothing.”

His simulations said that a distance of one mile would be optimal for the first try. It was far enough they could disengage and hightail it from the area should anything go amiss.

Bud took the helm with Zimby at his side.

Everyone had something to do, even Doc and Chow. They were tasked with the close observation scans. As Tom told them, “I need two pairs of eyes on things. The likelihood of both of you blinking at the same exact moment if something not-so-good happens is slight. Sing out immediately if anything about that hole changes.”

“Like what?” Doc asked. He knew he could tell at a glance the difference between an inflamed appendix and one that was about to burst, but things in space were new to him.

“Watch for color changes in anything or something that seems to be deforming in any way. If you see anything don’t just try to get my attention, I want you to hit that red button in front of the screen. That will sound the alarm and switch my view to what you are seeing. Then, yell out in a few words what you’ve seen. Let me be the judge if it is anything to worry about. Okay?”

Doc and Chow agreed.

The ship was properly positioned and the reactor was outputting ample power. The repelatron central core of the large dish was moving around and around matching its motions to the size and shape of the outer rim of the black hole. It quickly reported a lock onto five separate compounds in various locations around the perimeter and had activated the corresponding Attractatron dishes what to grab.

“Here goes,” Tom called out.

Two seconds later Doc shoved his hand down on the red button.

“Something’s coming out of the hole!” he yelled.

CHAPTER 9 /

PARALLEL PARKING IN THE ASTEROID BELT

“SCRAM!” Tom shouted.

Instantly, Bud's hand slammed into the controls sending them backward so quickly that everyone was thrown against their harnesses with enough force to knock the breath from them. He barely had the strength to stop them once they had backed away about five hundred miles.

“What wah thaa?” he gasped as Tom struggled to get back to his readouts. He had bitten the tip of his tongue.

Doc had taken the worst of it as he had carelessly loosened his harness and had been leaning back into his seat. The motion of the ship shot him forward into the harness with a bone-cracking thump.

About to respond, Tom looked at their medic and gasped. “Doc!” He hit his harness release and lunged over to the stricken man.

“Just... a little... case of a... slightly fractured sternum, skipper,” he said with a weak smile. After taking a couple careful breaths, he added, “You know that warning in airliners to keep your seatbelt tight when sitting down? Should have remembered that. Help me get over to the med room. I need to get my chest wrapped.”

He accepted Tom and Zimby's assistance and they moved him slowly to the small dispensary room. There, while Zimby helped Doc take off his shirt, Tom pulled a long and wide stretch bandage from a storage drawer and began wrapping it around the man's chest.

“A bit tighter, please.”

Tom complied and soon had the medic trussed up tight enough to keep the sternum from moving as he breathed. But, he was in some noticeable pain. He asked the inventor to open a drawer and pull out a self-injecting device. “Localized pain killer,” he explained when Tom handed it to him. A moment later, the injection having been administered in his abdomen, Doc's face relaxed and he smiled again, this time with no wincing.

“Wow, that's great stuff!” he proclaimed as he capped the

injector and shoved in into the waste disposal bin. You and Zimby go back and see what we almost got into. I'll be there in a few minutes."

"Okay, if you're okay..."

Doc nodded. "I am now. Thanks. That shot, by the way, is going to work for about twenty hours and then I'll have to find something else. Only supposed to be given once in any five-day period. Don't worry. We have lots of other stuff. Now, go!" He made a shooing motion so Tom and the pilot headed back to the controls.

"How's the tongue, flyboy," he asked as he sat next to Bud.

"Gonna hurt more tomorrow. For now it's gone numb. Thankfully. So, what the heck *was* that?"

Tom shook his head as he looked over the readouts. "Not certain, but maybe the high-speed video caught something. If it is bad, then we have Doc to thank for the warning and the shut down. So, let me see what we have." He brought up the video feed from the three thousand frames-per-second video camera starting five seconds before the appearance of whatever it had been.

As he got to the point just before the appearance, he slowed it down so that one second was going to take fifteen seconds to watch.

"There!" he said, pointing. Then, he laughed. "Okay, now I see what happened, or at least I think I know."

"Tell," Bud urged.

"Yeah," added Zimby.

"Okay. See that, well, *stuff* creeping up at the edges? That is just plain old space debris unless I'm mistaken. Seems our Attractatron's pull was stronger than the black hole. Not surprising given its small size, but disappointing. You see, if we can overcome its pull, it isn't going to do the trick for us."

"Sort of like a tug-of-war where fifteen large men are pulling against a group of ten girl scouts?" Bud offered.

Tom and Zimby chuckled. "Probably something like that. But, the proof is going to be whether we can replicate that. Take us back to our starting distance, Bud, and I'll see what we get."

Because most of *Goliath's* propulsion was at the back, and only smaller maneuvering repelatrons were mounted to the upper control compartment, it had required a bit of moving forward and back and forward again.

“It's as easy as parallel parking in the asteroid belt,” Bud quipped at one point.

By the time they were ready to replicate the experiment, Doc had returned. His eyes were slightly glassy, but he claimed to be ready for action.

“Okay, but tighten yourself in, and this time, Bud, if we need to back off, not so fast.”

“Right!”

A few seconds later the same sort of materials came slowly back out, but they hung around the edges. It was there they halted and could not be budged by the Attractatron.

Tom smiled.

“Now, let's see if we can move and still hold onto that hole,” he suggested.

Their first try was unsuccessful and the black hold slipped from the Attractatron grasp remaining where it had been.

Their next three tries were from decreasing distances with pretty much the same results. They were able to move it a little, but as soon as Tom poured on the reverse thrust it stubbornly slipped from their grasp.

“On the positive side of things,” he stated after taking several measurements, “it is being moved along with us. Not far, but it is moving. And, it stays where it ends up instead of slipping back to the starting point.”

He explained that meant it could be physically moved by them, but it also indicated that they needed to get closer where the Attractatron beams would be stronger and get a better grip.

“I only hope that our issue isn't because the rim of the hole is so small. If that's the case me might not be able to use that for our gripping purposes.

He checked the ship's clock and declared the work day to be finished.

“We've been at this for almost thirteen hours,” he told the small crew. I know those of you not directly on watch during that time had the opportunity to have a couple good meals, but all we four managed, thanks for Chow, were a couple sandwiches. Now, it is time for the next watch to relieve us, keep us stationary out here, and the four of us in the main seats are going to eat and sleep!”

Once they had been relieved, and that only took a minute as

their replacements had been standing by for the past several hours, Chow told them to have a seat at the slide-out table just outside his galley. He served them a hot meal of fragrant ground turkey meat with Asian-inspired spices and vegetables over rice.

"It's darned good, Chow," Bud complimented the chef around a mouthful of food. "What do you call it?"

With a perfectly straight face, Chow replied, "Miced turkey."

Bud made a show of swallowing before he squeaked out, "*Miced*?"

Chow chuckled, "Yep! Ac'shully, it ought ta be called *minced*, but I was walkin' past a Chinese restaurant over in Oswego a year or so ago and stopped ta look at their menu. Right there, plain as day, was miced beef, an' miced pork. I had a good laugh once I figgered that out. Somebody forgot ta put in the N. Anyway, I went in an' ordered some an' it was tasty. What ya got there's my version."

Doc, even though his shot was wearing off a little early, smiled. "It's great, Chow. Really. And, not just because I'm full of happy juice and tired as all heck."

The four men went to their cabins and got in bed. Doc got back up ten minutes later, walked to the Dispensary room and pulled out a couple strong pain pills that he took with some water.

Twenty minutes later he was sound asleep.

They all woke about the same time but Doc was in enough pain Tom asked Hank to take his place for the next shift.

"Happy to oblige, skipper, but I just got off an eight hour shift forty-five minutes ago. If you can wait a couple hours I'll grab a nap and then help. Right now my eyes are crossing a little."

"Sorry, Hank. I should have looked at the roster. Go hit the sack and we'll have you work with us next shift. But, can you ask Red or even Duanne to join us?"

"Sure. Red was with me, and he's already sacked out, but Duanne's only on navigation stand-by right now. I'll have him here in a couple. Night!"

When the young man walked over he looked apprehensive. "Something up, Tom?" he asked.

Tom told him about Doc being out of action.

"So, rather than waste your talent on sitting around in case the navigator can't handle sitting still in space, I thought you

might like some practical experience."

The man's face split in a huge smile. "Would I ever! Just tell me what to do."

The inventor filled him in on what Doc had been responsible for and asked him to take that seat.

"If you see a problem, other than just some dust and dirt coming up from the hole, you need to hit the Attractatron shut-off switch and yell out. But, let me show you what to not panic over." He brought up the dust and debris video, playing it in both real time and slow motion. In minutes Duanne declared he was ready.

"Okay, skipper. Where do we start this time?" Bud asked. "Last we did this, we started at thirty-two hundred feet."

Tom took a breath and let it out slowly. "I really hate to be overly cautious but I think we still need to do this in two hundred-foot increments, so let's try three thousand." Bud had them there in ninety seconds and Tom energized the Attractatron.

As before, debris was pulled up to the edge of the hole where it stopped, balanced between the strong pull of the ship and the gravity well of the hole. Three minutes later the hole broke free from them but this time they had moved it nearly five hundred yards.

With each reduction of a few hundred feet the small black hole seemed to be more firmly remaining in their grasp, but as Tom had Bud increased their speed it continued slipping the bonds of the Attractatron.

By the time they called it quits for another day they had gotten to within twelve hundred feet and could maintain a good grip until their speed exceeded half a G acceleration.

"Is this ever gonna work, Tom?" Duanne asked as they sat eating.

Tom shrugged. "It is looking better and better. My original calculations said we probably need to be within five or even six hundred feet for this to work and then we might need to revise how quickly we accelerate everything, but I believe we are getting close to proving the first half of the concept."

Duane's brow furrowed. "Remind me what that is?"

"Sure. That we can grab onto a small black hole and maneuver it around. All that remains to be seen is whether we can get close enough, safely enough, to use the enormous gravity field to also

drag us along with it as we continually shove it out of our way."

Duanne nodded. "As simple as that, huh?"

Bud tapped him on the forearm. "The skipper always does the impossible in such a way as to make it seem simple. It's kind of a skill."

Duanne snorted. "Right. You do know I was being sarcastic, don't you, Bud?"

"Sure, and you do realize *I* was being ironic?"

"Oh. Okay, you got me on that one. My family didn't much go in for irony. Sarcasm and verbal abuse were about the limit for us when I was growing up."

"No matter," Tom broke in on them, "I think that by this time tomorrow we are going to know one way of the other if my theory is going to come true. Once we prove or disprove it, we drop the hole, set a marker, go home, and I build a ship that can actually use the thing on a really long voyage."

"About that," came a voice from behind the three men. It was Doc Simpson.

"Well, hey, Doc," Bud greeted the man. "You okay?"

The doctor nodded. "I just used the SimpsonScan of Tom's to check out the situation in my chest. As it turns out, the sternum is slightly cracked. My pain comes mostly from a separated right rib, number four up from the bottom. The cartilage is torn."

Duanne asked, "Anything you can do about that out here?"

"Not me. But, I think Tom can."

"Huh?" Tom uttered spinning to face their friend. "Me? Last time I checked, my certificate from the 'I can play a Doctor' school hadn't come in the mail. What gives?"

Doc gingerly sat down next to Duanne. He slightly winced as his bones settled into the new position. "Well, for starters I have a miracle in my black bag of tricks, but it takes a steady hand and a really good eye. I figure you for both those. The MedCast Company came out with a fast setting bone glue and filler a month ago, and I happen to have ordered some. It came in time for the trip. It works to bind the calcium in bones and provides a sort of latticework bridge for new bone to fill in. It also is reported to work to seal cartilage tears pretty well according to reports. I need you to help me administer it."

As he told them about what would be necessary Duanne turned a sort of soft green color and got up in a hurry. "Didn't

mean to make him feel ill," the physician explained, "but it is going to require that you cut me open. Luckily, that laser scalpel you also came up with a few years back will keep bleeding down to practically nothing, And, I'll be awake to help but won't feel anything across my entire chest."

Tom wanted to be any help he could, but he had very little other than basic first aid training.

"When do we do this?"

"Right now if you have an hour. Maybe a little less. I've got a video you can watch so you know what you are in for, and while you're watching that I'll numb myself up."

Bud gulped but had to ask, "Do you need me?"

Doc chuckled which made him wince again. "Only if it will convince you, once and for all time, that I am fully human and not some medical robot—and don't think I haven't heard that you mentioned that to our favorite physician's assistant and soon-to-be med student, Debbie."

Bud grinned, but it had an air of guilt to it. "Sorry, Doc. And, if it's all the same to you, I'd rather keep down this meal Chow prepared for us."

Doc and Tom got up and headed slowly for the Dispensary room. With the door closed Doc handed Tom some special goggles. "To keep the ultraviolet light that will sterilize everything from harming our eyes," he explained.

Five minutes later Tom was watching the video. The operation was a simple one that required only a short incision—about two inches in all—directly over one side of the sternum followed by the use of a tissue spreader and then using the glue that would be dispensed from a special pistol-looking device. Then, a few sterile strips along with a special skin sealant and the work would be complete.

Doc removed his shirt and lay down on the fold out table. With his guidance Tom swabbed the area to be cut into with a special blue solution that not only killed all bacteria remaining on the skin, it also tightened that skin making it easier to cut into. For the inventor it depersonalized it as well making it seem like he was cutting into plastic and not a human chest.

Tom clenched his teeth and made the cut. It was easier than he anticipated and, as Doc had commented, the laser scalpel cut and cauterized the skin so there was less bleeding than from a good paper cut.

“That's very good, skipper,” Doc told him as he watched on a monitor to his left. “First, put some of that skin sealer at both ends of the cut to keep it from going farther.” Tom did this and was amazed at how the clear liquid turned a bright red and then went opaque and finally white as it set. “Now, put the two fork-prong ends of the spreader into the cut and start twisting the little knob. Once you have things about a third of an inch apart, cut down through the rest of the muscle and fascia layer. It’s what you'd call silver skin if I were a piece of meat.”

Tom did this and gasped as the edge of the sternum was exposed along with the end of the rib that was now about an eighth of an inch away and a quarter-inch above from where it should be attached. Using a pad of surgical gauze he dabbed the small amount of blood in there leaving the open area mostly dry.

“Take that glue device, pull the plastic strip to open the end of the tube inside, and use it like a small caulking gun. In the butt of the handle is a sort of spatula to smooth thing out. Don't worry if you get too much on me. It doesn't set for ten minutes so you have plenty of time to clean out any extra.”

In under the allotted time Tom had repaired the crack running vertically along the sternum and had bridged the space between the rib and its normal attachment point. The hardest part had been holding the rib still and back in position while the “cement” set up.

Doc was sitting up less than thirty minutes after they started, buttoning up his shirt.

“Good job, Tom. I'll make a doctor out of you yet!”

Tom watched as Doc gave himself an injection of a strong antibiotic just in case and then helped re-tape his torso, this time on the outside of his clothing.

“By this time tomorrow, I'll be practically good to go!”

That worked out very well as it gave Tom ample time to get some rest and then go back to testing the various distances and speeds they could travel with the black hole in tow.

To nobody's surprise Tom's theory they would need to be within five hundred feet was fairly accurate. At that distance the pull of the black hole was strong enough to draw the ship forward until the Attractatron stopped them. Only once they stabilized at that distance did Tom have Bud begin moving them both.

Now, there was no detaching from the hole. This time *Goliath* managed to not only back away at up to 1.5-Gs, when Tom

decided to attempt forward motion—something they had avoided once they surpassed 1-G as it would be sending them right into the hole if things went wrong—black hole and ship remained tightly locked together until Tom suggested a maneuver that could effectively fling the hole to one side as the ship jerked in the opposite direction.

For a moment it seemed the black hole was about to break free but Tom's quick hands increased the power to the Attractatron, and the computer balanced the push and pull forces so finely the hole remained in position. In the end, ship and hole were now on a new course.

“Seems your theory is proving to be true, skipper,” Hank complimented the inventor as he stood behind them while they slowed to a stop and released the hole.

Bud backed them away as the Attractatron was slowly powered down so there was no danger of the hole trying to pull them in.

“Did we prove it?” Doc asked from his seat.

“We proved we can control that hole, but tomorrow, before we go home, I need to see if we can actually use it to maneuver us. So far Bud has kept us under *Goliath's* power as we've pulled and pushed the black hole. Now, we need to see if the hole has the strength to move us all on its own.”

After their rest break the ship maneuvered closer again and the Attractatron started the balancing act between ship and hole. There was nothing happening at five hundred feet, so Tom asked that the ship be brought slowly closer and closer still.

Four-fifty... four hundred... then three-fifty.

At that point a jolt was felt throughout the giant ship and Tom cried out, “Get us out of here! We're on a collision course for the hole!”

Furiously, his hands raced over the controls but no matter what he tried, *Goliath kept being drawn closer to the black hole!*

CHAPTER 10 /

GOLIATH HEADS FOR HOME

THE TRIP home began on a high note. Tom had not just proven the viability of using the black hole to power his new ship—whatever that might prove to be—he had shown that at a close enough range the reaction between ship and hole meant that there would be no apparent inertia to overcome. They would be able to accelerate fast and furious without the need for remaining strapped in and taking time off to coast to keep from harming themselves.

It was better than a win-win situation in the inventor's mind.

What had begun looking dire for them turned out to be fortuitous. When the hole started to drag the ship closer it only served to provide the final puzzle piece. By the time Tom and Bud managed to stop the forward creep—at about one hundred and ten feet—everyone took a deep breath and then noticed they were still moving.

Only, this time they were moving in concert with the hole. It remained in position ahead of them and was, as Tom hoped it would be, dragging them along as the powerful Attractatron shoved it away as fast as it was moving. And, they were speeding up.

Cautiously, he had Bud reduce the *Goliath's* power until the repelatrons were in standby mode. Still, they raced forward.

"I'm not feeling any acceleration, skipper," Hank commented from his seat behind Tom and Bud.

"That is because the effect I wanted to come true, has. Since we are held in a very powerful gravitational field, and are moving just as fast as that field is, in effect we are not moving in apparent space relative to the gravitational field. So, no movement means no inertia that would be shoving down on us under normal conditions."

Tom unstrapped himself and got up. Standing there he tested his balance and then took a few steps forward, backward, and even did a little spin.

His smile told everyone things were just fine.

"Bud, slowly try to maneuver us to the right. Sort of like a pendulum and only about fifteen degrees. We need to see if we

have the ability to steer that hole and us along with it."

To put it briefly, it worked. As *Goliath* slipped to the right, their course changed in the same manner as a boat might if the tiller were on the front instead of the back.

In other words, they ended up heading to the left as the "drive" pulled them in the new direction.

"That's going to take some getting used to, Tom," the flyer in the pilot seat said. "Sort of steers like an elephant if you only have the tail to push to one side or the other."

"That I can overcome with a good computer program, Bud," Tom told him. "Keep maneuvering us around for ten or twenty minutes. Then, I want to see how far we need to travel in order to make a one-eighty turn."

It took them four hours to swing back around, and at that point Tom had already asked Navigation to plot a return position and time to get them back to their start point.

"Assuming we want to take the Sun's gravity into consideration, skipper, we already need to slow down and get on a course at fifty-seven degrees from direct solar approach. In three hours, fifty-six minutes we need to drop down to a near standstill."

It had been trickier than anyone thought. In fact, it took the combined skills of Bud and Tom, and three additional course swings, until they got back to within thirty thousand miles of where they had started.

At that point Tom backed them away to the five hundred foot distance and used *Goliath's* ion power to maneuver them back into the proper position.

"Should have thought of pushing us back before, Bud. Oh, well. We've learned a lot. Let's drop off our little friend where it ought to be and head home."

Landing the *Goliath* was a lot different than taking off. For one, because the control room was very high off the ground and there was the matter of the great loading platform in the way of direct sight, everything needed to be accomplished using cameras and ground-reflecting RADAR. At one point in its development and testing Tom had considered adding an extendible rod that would drop out, perhaps by fifty feet or so, and once it came in contact with the ground it would provide definitive feedback as to how much farther they needed to descend.

The single test of that proved only that a ship as massive as *Goliath* could easily crush even a reinforced Durastress pole if it was coming down one degree off of perfect alignment.

So, that had been removed in favor of a new method using a laser distance probe on each of sixteen points around the huge repelatron dish that also served as the landing gear for the ship.

Each one began firing off their invisible beams from a height of two hundred feet and calibrated everything with a central computer. Fractional differences were checked against a high-definition video of their landing site so that natural anomalies would not cause the ship to unexpectedly tilt to one side in an attempt to compensate for something that was not going to be a problem.

To some extent he had contemplated allowing the bottom structural ring inside of which the actual repelatron dish could swivel to tilt slightly, but that might end up causing an overbalance situation. The *Challenger* featured hydraulic landing pads that could compensate but she was a much smaller ship so this was acceptable.

In the end Tom had added thirty-two small legs to the outer edge of the landing ring. Each one would operate independent from the others and extend by as much as two feet.

Now, as the ship settled to the ground the legs, or as Bud had dubbed them, the Magic Slippers, eased back into their retracted position and the massive repelatron shut down. The secondary dishes mounted just under the center of the cargo platform continued running at minimal power until the master computer assessed the wind situation. Too much wind—something that occurred on Fearing Island a few times each year and especially during hurricane season—could jeopardize the tall and yet surprisingly light ship.

Today, the computer found nothing to indicate the need for stability so everything shut down as the crew got ready to take the elevators down to ground level.

“When do you suppose we'll be heading out again, Tom?” Doc asked. “Always assuming that you want to take me along, that is. Hope my little injury didn't put me on any no-fly list. I really enjoyed the time up there.”

Tom grinned. “Doc. If injuries precluded anyone from doing dangerous or even fun stuff, then you know better than anyone I'd be grounded permanently! I'm not sure when we go back up. Not yet, that is, but you are cordially invited to be a member of that crew.”

“What's left to be done before we can build the new ship?” Zimby asked as he walked along side Tom, Bud and Doc.

With a little snort Tom had to admit, “Just about everything, Zimby. I have the basic design I want to use, and Hank will tell you he and the Construction Company people are standing by for the first pieces to be approved to come off the line. After that it will be a lot of tab A into slot B stuff until we have a ship.”

“Speaking of which, and because I just heard my name,” Hank said as he caught up with them, “did your dad tell you Jake and I just completed building a new, giant and improved vacuu-form bed?'

The vacuu-form could take any computer design, set up the shape by arranging magnetized microbeads for all the contours and then let technicians pull over any number of specialty fabric sheets to cover the mold, then cover it with a plastic membrane and flood the bed with one of six different resins and polymers. Powerful vacuums sucked the excess liquid out forcing it into absolutely every fiber after which they were heated up to set the shape. Then the nearly finished part was uncovered, trimmed and slid into a curing oven that set it to maximum strength.

“No, there's been so much going on he didn't. How large is it?”

“Massive. We can now do individual pieces, or groups of pieces, up to thirty feet wide by one hundred feet long up to five feet thick!”

Bud let out an appreciative whistle. “That incredible! So, you can do whole aircraft wing tops or bottoms in one piece?”

“Yes, Bud. And more. From the preliminary designs Tom sent me I believe we can do his fins for the new ship in just four pieces each. The old bed would have taken eight or ten runs per fin. Plus, the new curing oven works thirty percent faster now that we've added infrared heat to the mix!”

Tom was happy, but stated, “It's still going to take a lot of pieces to form the hull of the ship if the maximum depth is just five feet.”

Hank stopped walking, and so did everyone else. “Not necessarily so, Tom. You see, we've also added a forming rig between the bed and the oven. If a sheet needs to be bent or curved, even at a ninety-degree angle, we can now do that before the piece is set solid. So, near the upper part of any conical shape we may be able to do that in just two or three pieces. In fact, depending on how we slice the work I can easily see the top

twenty feet of the ship being made in just two halves."

Tom smiled. "So, less to assemble and a faster turnaround until the ship is complete!"

"Something very much like that," Hank said, proudly. The forming rig had been his idea and design.

Minutes later they all arrived at the side of the *Sky Queen*, their ride home to Shopton.

As the inventor reached for the keypad to open the side hatch, Zimby cleared his throat. When that failed to get anyone's attention, he did it again only much louder and more dramatically.

Tom spun to look at him before recalling what this would be about.

"Zimby? Did you want me to open the back hangar so you can take out your little ride home?" he asked with a twinkle in his eyes.

"Yes, please," the test pilot said with a smile.

"What little ride?" Bud asked.

"Bud? Do you recall several years ago flying something a lot like a one-man cruise missile and ending up flying upside down?"

Bud grinned and blushed at the same time. It had been a small, one-man racing jet Tom was building for a league in Nevada. Although the league had only lasted two years before its owner decided that having daredevils flying up and over, down and under, and tightly around inflatable obstacles in an aerial motocross wasn't exciting enough, the little jet was still being produced for personal users in small numbers.

"Sure. Fun and heart-stopping all in one! What gives?"

Zimby now spoke up. "Well, Bud, I was in Mongolia last year on vacation with my daughter. Trying to give CeCe a bit of culture and get her to stop saying she wanted to try having hot tea with a pat of rancid yak butter floating on it."

"Yuck!"

"Yeah, but it was from some book she had read in school. So, we went there and while there I was asked by the government to come talk to them about a little project."

He explained as the group moved to the back of the giant jet and dropped the loading gate to ground level that the Mongolian government had a problem with patrolling their enormous

nation, and especially across the Gobi Desert where hundreds of people died each year trying to illegally cross out of either China or North Korea. They needed light, fast and flexible aircraft to do the job.

"Sometimes they will want them to run automatically, like our security drones," he said looking to the sky where eight drones patrolled endlessly. "And, they also want those very same aircraft to be able to be manned."

"So," Tom picked up the narrative, "Zimby came back with the information and dad and I have been working on it off and on for a few months. The best thing we came up with was an adaptation of the one-man jets, but with greatly enlarged fuel tanks, larger wings and more powerful turbine."

The gate now lifted the men up to the back of the hangar, which obliged them when the massive door slid up into the ceiling. There, sitting on the floor, was a bright blue aircraft looking more like a flying torpedo than anything else. An indented saddle for the rider/pilot on the original aircraft now had a companion saddle behind it. Tom explained this would be to airlift people out of the desert if needed.

As the team unstrapped the aircraft and rolled it back to the gate, he also told them a few of the specifications.

The new version could fly as fast as two hundred knots or as slow—in the unmanned mode—as sixty-two knots. With a pilot those numbers came up by twenty on the low end and dropped by fifteen knots for top speed. It carried enough fuel to fly from one end of the desert to the other—nearly nine hundred-fifty miles—non-stop and get at least half way back.

The Mongols planned to build fueling stations at several locations around the desert's perimeter.

Bud noted the wings had been extended about two feet from what he remembered and Tom said he was correct.

"Not just twenty-five inches longer, Bud, but raked back an extra one degree. Zimby is going to fly her home on the first real speed versus fuel consumption run. We'll follow him straight over to the coast before we head for home."

"And I will be flying at about five thousand feet," the pilot, said, "so if I get into any troubles I can parachute to safety!"

Ten minutes later both aircraft had takeoff permission and departed the island. Ten minutes after that, Zimby notified Tom everything was running smoothly and he was turning for home. Tom wished him well, cautioned him to keep in contact with

Enterprises, and then turned the *Sky Queen* to the north and shot away at high speed.

As the jet crossed above Washington D.C. Bud quipped, “I guess Zimby is your new best friend, huh? He gets to have all the fun.” Try as he might, he failed to keep a straight face and broke out laughing.

“Yes, Bud. Zimby is my new friend. And only he gets to fly that little jet. No, actually since it was his contact with the Mongolian government I thought it only fair he take the first long flight. So far he has only had it up for quick loops around Lake Carlopa. Even at that, he's only had her in the air for five minutes at a time.”

“That's okay, skipper. I like Zimby, and he deserves this. I only hope his old habit of crashing prototypes doesn't bite him.”

Bud was joking, but the truth was that of all seven of Enterprises' test pilots, Zimby Cox had crashed more times and for more reasons than any of the others. Not that all were his fault. In fact, there was no instance of pilot error in his record. Each time it had been either equipment failure, or in one case, a fellow—young and untested—pilot who froze at the controls and nothing Zimby could do once it became evident what was going on could prevent them from taking an unscheduled swim in the ocean off the coast of Maine.

“I have plans for you to try for the altitude record on that,” Tom told him. “So far the originals have never been up to more than three thousand feet. Never was a reason. But, in Mongolia they would like to be able to fly as high as seven thousand to get a better long-range look at things.”

“Just as long as I get a comfy warm flight suit and an oxygen tank, I'll be a happy pilot, skipper!”

The jet landed on its vertical lifters just before five in the afternoon. As they deplaned, Hank asked Tom if he wanted to come over to watch a wing assembly for a new cargo jet coning out of the new vacuu-form device.

He jumped at the chance, and although Bud might have liked to tag along, he needed to grab some paperwork from his office and get over to the Communications building to pick Sandy up before five-thirty.

Tom and Hank hopped into one of the small electrical two-seaters kept all over Enterprises and the Construction Company for employees to use rather than walking or using their own cars. A minute later they zipped out the main gate and headed for the

Construction Company.

There, Tom parked next to building three, home for three large and one small vacuu-form machines and ovens.

“Pretty soon I'll have to get a building put up just for these,” Tom joked, only they both knew it wasn't really a joke. There had already been some talk about either moving some of the construction work over to Enterprises—where a building would need to be erected—or put that structure up here in the heart of the Swift's manufacturing business.

Hank nodded. “I've been thinking one of the inflatables would do the trick. In fact, since work is starting soon on the permanent Admin building over at the automotive company, would it be out of line to ask to have that once it’s taken down and get it set up here?”

In order to save money and get the car company up and running as quickly as possible, the decision had been made more that two years previously to not wait for the third building to be constructed at the newest site. So, one of the mid-sized inflatables that had originally been developed for the Mars colony had been erected—inflated—on a concrete pad and an interior structure built for all the offices and storage and meeting spaces.

It had served the purpose, but now that the company was making a very good profit, the time had arrived to go for something solid.

“I see no good reason why not, Hank,” the younger man replied. “In fact, it's a great idea! I think the plan is to have the old building taken down next month after the first walls have been tipped up and the roof put on. Then, after that gets dragged out the insides will be rebuilt from most of the structure they are using today, plus the additional thirty percent or so more space they will get. So, I'll clear it with dad and Jake.”

The new vacuu-form bed was amazing. As mentioned, anything could be formed by simply allowing the computers to magnetically influence the tiny beads into that shape and then filling it.

For the wing, the shape was already set including the internal braces and the runs for all controls. This jet model used both vertical lifters that featured nuclear reactors super-heating water to shoot out steam, so the wings also had ample tank space for that water along with the aviation fuel for the QuieTurbine jet engines that would shoot it through the air at 97% supersonic speeds.

“Help me pull the fabrics, will you?” Hank requested. The two men watched as the giant roll of the fabric that would form the outer skin—in this case carbon fiber—slid out of a holding area and lowered until it was even with the top edge of the bed. Together they pulled and walked the fabric to the far end and secured it to the hold-down arm. Moments later air blowers gently shoved it into the mold and mostly into place.

They repeated the process with the two layers of Kevlar and one of Tyvek followed by the final layer of carbon fiber.

The membrane rolled out from the far end until it covered everything. Vacuums drew out the air until the fabric was in place, and the two men used long-handled soft brushes to gently ease it into nooks and corners.

The rest happened automatically. A flood of a pinkish liquid oozed into the sealed area and soon covered everything. A small bell pinged and that liquid was drawn back out by a series of pumps until there was only enough left to keep the fabrics soaked.

Then, the membrane was more forcefully drawn down. The shape was checked by a laser scanner on an armature that raced from one end to the other. Green lights on the control board assured them all was exactly as it should be.

“Now the fun starts,” Hank said. Tom knew this meant the light-proof cover was about to stretch over everything so that the bright curing lights did not harm anyone's eyes.

Two minutes later there was nothing for them to see.

“So, since we won't need to use the bending rig this cures for an hour inside the bed, comes out and the evening crew will do the hand-trimming of the little fiddly bits we inevitable get around the edges, and then it hits the oven for a long and slow all-night cure. By this time tomorrow, the top will be coming off and the following day, or rather Monday, they will be mated and sealed.”

Tom regularly was responsible for some of the most amazing things ever to happen and yet he was astounded at the machine and its capabilities.

Years before each wing assembly took three long and tedious weeks to construct, rather than three fast and easy days!

“Let's hope that the new ship comes together this easily, Hank. With everything we need to figure out the sooner we get to Eris, the better off every man, woman, child and animal on this planet will be.”

Including my wife and little boy, he silently reminded himself.

CHAPTER 11 /

AN UNAVOIDABLE CONCLUSION

NOW THE concept and theory for their means of propulsion had been established, Tom worked to finalize his design for the ship that would take him and a small crew out beyond the orbit of Pluto to where man would get a chance to see a nearly invisible planet up close for the very first time. Not even unmanned probes had managed that feat.

Tom felt guilty about not speeding enough time with Bashalli and little Bart, and tried to take off on the weekends to be with them. Most of the time it worked out.

It was on the fifth weekend that he nearly broke down.

Barton Swift was a curious baby and according to both Doc Simpson and his specialist pediatrician, he was developing the sort of physical and mental skills most children were getting to by the age of nine to twelve months, and he was just six-and-a-half months old.

It was Saturday night and Bashalli had just brought in dessert for the adults, and a small handful of brightly colored oat cereal rings for Bart. They were a favorite of his and were given when he behaved and ate his strained carrots, beets, or other gooey mess that his mother fed to him and had since the boy turned about five months old.

As Tom brought a spoonful of the berry cobbler to his mouth, Bart let out a little screech and looked at his father.

“Da!” he stated looking very serious about the matter and then nodded before throwing half his cereal treats onto the big table. “Da,” he repeated.

Tears streamed down Tom's cheeks as he looked at Bashalli who was openly weeping. It was Bart's first recognizable word and it most definitely had been directed at his “Da.”

“Gawd, Bash. I feel so guilty about not being around much. What am I going to do?”

She dabbed at her wet eyes with her napkin, put a grin on her face and let out a sob mixed with a short laugh.

“You, my wonderful husband and the father of our son who obviously knows *exactly* who you are, will keep doing what you do. I know, and someday Bart will know how important what

you are doing about this planet and the comet is. It only seems like you are not around because you and I both have our jobs. I feel even more guilty because I am his mother and was the source of his food for many months. Now that we are getting him on some solids, I have been feeling that I've let us all down, but my mother explained that this is how it is with new parents."

"So, we're not the bad guys here?"

Now, she laughed openly and came to sit in his lap, giving him a damp kiss.

"No. We are perfect in almost every way and if we were around too much he might not be progressing as quickly as he is. We are doing this just exactly right so neither of us should feel anything other than proud. Right, Bart?" she asked looking at the baby.

"Da!" he declared nodding his head just like his mother was doing.

* * * * *

As the coming eleven weeks passed, the ship began taking shape and then, as if by a magician's hand and the speaking of a few words, it appeared overnight out on Fearing.

Actually, it had been constructed in giant sheets and pieces back in Shopton, transported to Fearing in the container pods of the giant Super Queen, and was undergoing assembly from the day after Tom gave the go-ahead.

Only recently had the shell of the main body—fins and all—been attached to the pre-build module that was the upper thirty-five feet for the crew and electronics and the entire ship tilted upright.

Because there was very little of a totally new nature to the ship, only the shape, and because Enterprises and the Construction Company had all the necessary equipment, forms and materials, it was ridiculously easy to construct. And, it was modular. What went into one fin went into the other three. Inside the main body, at least below the living quarters, much of that space was taken up with numerous tanks. Tanks for the fuel for their many small rocket motors to provide fine steering and motion, tanks for water for the crew, tanks for the gases they would breath and finally, tanks for waste. Much of the air would be recirculated and that particular equipment was an off-the-shelf item having been first designed and built for submarines and Tom's mighty *Challenger* spaceship.

It also helped that the men and women building the

individual parts and those putting them together into the starkly beautiful ship had a lot of experience in building everything from automobiles to the aforementioned submersibles to other spaceships to prefabricated buildings.

Where some nations or companies still built rockets from hard and heavy metals, most of the construction within the Swift organization relied on a combination of lightweight and easily worked alloys along with some of the super polymers and plastics that had been developed such as tomasite, Durastress and plasteel, a highly pre-stressed metal skeletal structure over which was formed a body shell of liquid Durastress and that, in turn, was covered with two layers of carbon nano-fiber material. Ounce for ounce it was one-tenth the weight as extruded steel with five-times the strength.

That material formed the “bones” of the ship while all the surfaces were vacuu-formed from layers of various flexible materials that were bonded together using special liquid polymers and great heat.

Such was the weight savings that the ship, nearly two hundred feet tall and eighty-four feet wide at the fin tips, the body tapering from fifty-feet to a tip only two feet wide, that it weighed in at one-third the weight of a fifty-seat commercial jet.

That would be added to by the four nuclear reactor power pods, but they were also constructed from lightweight materials, primarily tomasite, the Swifts' incredible radiation-defeating plastic.

As the ship took form, Tom and a team of computer engineers worked tirelessly on both the physical electronics as well as the special programming to operate everything.

It would be possible for a one-man crew to take the ship off and fly it to their destination, but Tom knew he needed at least three sets of two pilots each plus several specialists. He hoped to talk Doc Simpson into coming along as well.

For several years the medico had occasionally accompanied Tom on adventures, and he always came back enthusiastic about going on others. But with the press of his duties at Enterprises, the opportunities were few and far between these days.

The addition to his staff of a brilliant young woman, discovered first by Tom and her excelling at learning meant she had progressed from high school girl to Registered Nurse in under two years, and then qualified as a Physician's Assistant two years later. Now, she was about to go into her second term of med school and would make a superb doctor.

Debbie Bates was a phenomenon. And, as it happened, she would be on a four-week break at the same time Tom hoped to head to see what was going on out at Eris, so she would be home and taking over many of Doc's duties.

Things were certainly coming together.

* * * * *

"Bud? Got a couple spare hours?"

"Sure."

"Want to join me for an inspection tour of the new *TranSpace Dart*, flyboy?"

Bud's head nodded so vigorously it was in danger of giving him a neck ache. "You bet! When?"

Tom looked at his watch, pretended to be pondering something, counted a few times up and down on the fingers of his right hand and then smiled. "Now?"

Bud was racing across the tarmac toward the Barn before Tom could shout out to him. He caught up with his friend a couple hundred feet away and said, "We're in no in danger of missing anything if we casually walk the rest of the way, you know."

Bud slowed but only to a fast walk. "Sure, but you know the rule. Whoever touches the Toad first gets to call 'pilot!' and the other has to take shotgun."

Tom stopped. "Since when is *that* a rule?"

Bud also stopped and turned to face him. "Since eight seconds ago, unless you let me call 'pilot' right here and now."

Tom smiled. "She's yours, flyboy. I need to TeleVoc dad and let him know we're going out, then both of us need to speak with our ladies and tell them we may be a little late for dinner."

They stopped and while Bud called Sandy, Tom spoke silently with his father. Then, he called Bashalli at her work and explained he would not be home until about eight.

"In that case, you will need to stop at the Chinese restaurant on your way home and bring dinner. I must stay late as well so this works out for both of us. I only hope my mother doesn't mind watching Barton for a couple extra hours."

Tom laughed. "The day either of our mothers minds watching their grandson is the day you and I will need to get serious about one of us quitting, and I don't see that coming any time soon. I love you and I'll bring home dinner. Bye!"

He and Bud were soon winging their way to Fearing Island where the new ship was standing upright on its four delta fins, the control room at the top some one hundred ninety feet up.

Bud received lading permission as soon as the patrol drones could be moved away and landed on the main runway and taxied over to a parking spot within a few hundred yards of the *Dart*.

"What's left to do?" Bud asked as they strode over to the closest of the fins.

"She's just about complete from the nose back through the living spaces and most of the electrical and electronics have been installed or are about to be. As you can see the reactor pods are not here, yet, but will be by this time next week. Ditto the main repelatron for the underside. We are, by the way, running with a single large dish that can be swiveled about seventy degrees to provide steering."

"And, for fine maneuvering?"

Tom pointed up to where a series of small indentations could be seen running along the inner edge of the closest fin. "Those. Chemical reaction motors with enough power to spin the ship around in a circle every nine seconds if need be."

He keyed them into the side of the near fin where a small elevator—wide but not at all deep and meant for just two people at a time—opened its doors. They traveled slowly up. By the time they had passed the half-way point up the fin the elevator paused, turned ninety-degrees and slid into the main body of the ship. It took a full minute but the doors opened and they walked out into a circular room some fifteen feet across.

"The lower main living level," Tom explained. It was mostly open space with a small kitchenette at one point, an exercise platform they both recognized as being he same ones used in Damon Swift's mechanical fish-shaped submarines built for the Australian Navy, and a few computer stations along with ten comfortable-looking reclining acceleration couches.

"The kitchenette is attached to a refrigerated auto-pantry below us. Call up the food you want and it is pulled from inventory and delivered. Heat and eat stuff mostly and the entire crew can be fed in under twenty minutes."

Bud counted the seats around them. "Ten crew plus a couple pilots? Or, more?"

"No, just a total of nine or ten total crew. And this is really the relaxation space. Next deck up is a little narrower and has the rather cramped rooms for the crew plus a tiny dispensary for any

medical needs. Above that is the control deck. Come on!”

They headed to one of the three ladders set into the outer walls and climbed to the next level. There, a small central open area was surrounded by accordion-door cabins, one for each man or woman in the crew. An additional door, wider than the others was open and they could see it was nearly outfitted as their medical room. In the middle of the floor was the ladder up. A dozen rungs at a slight angle led into an open circle.

As soon as Bud started up he noticed the retracted, two-part air-tight hatch that could slam shut in an emergency. It would slide into a space left in the ladder so that would provide no interference.

On he climbed at Tom's urging until he could get one foot onto the narrow platform next to the left seat. He slid into the seat and leaned back into it.

“Jetz! Talk about comfortable!” he proclaimed as Tom joined him in the copilot's seat. “And, what a layout.”

He meant the control panels that wrapped around both positions in one continuous arc. Above that was a three hundred-degree monitor the inventor explained would give them nearly the same view as if it were a clear view pane to the outside.

“I felt it best to keep things as sealed as possible since right in front of us will be that black hole. No good reason for us to be staring into it all the time.”

“I noticed there are no little artificial gravity emitters in the ceilings down there,” Bud commented tilting his head toward the hatch going down.

“And, none up here, either. I am counting on always being under the influence of the black hole when we are moving and then really don't mind us floating around a bit when we are just hanging in space. But, just to let you know they are actually there. We've just put them above a thin ceiling panel. If we need them, we can use them. Otherwise, like I said, a little weightlessness might be a nice thing.”

Bud, ever the pilot, studied the control panel as soon as Tom showed him how to energize it. As with all Swift control and instrument panels these days, it was really a giant monitor on which everything appeared, and everything could be arranged to suit a specific pilot's desires. That person's setting could be recalled at any time to instantly rearrange things when they came back on duty.

“I'm loving it, skipper!”

They climbed back down and looked into one of the tiny cabins. Inside every other one, the bed was near the floor with a sort of ceiling above it. In the next ones the bed was near the actual ceiling up on a platform.

“It was the only way to get this many beds in there,” Tom explained. “Staggered like this with just enough changing space. Oh, and the bathroom is a shared single person facility next to the dispensary room in case you had that question come to mind.”

Bud grinned.

After speaking with the construction supervisor who was inside the lower body area, the boys walked back to the Toad for their trip home to Shopton.

“It's going to be a little cramped,” Tom admitted, “but I don't think we are going to be out there more than a couple weeks at a time, so comfort is not going to be a deal breaker.”

“I have one final question before we get back into the Toad and call the tower for takeoff permission,” Bud said. “The upper control room is still nearly eight feet wide at the top. So, what's up in the nose above?”

Tom looked at his friend. “Think about it, Bud. Think about how we are planning to travel at such a high speed.”

Bud's mouth formed an “O” and he blushed. “Right. The ship's Attractatron, huh?”

Tom patted his friend on the shoulder. “There will also be a few maneuvering rockets. It's been a long day, Bud. You can be forgiven for having a momentary brain freeze on that.”

“Just don't tell Sandy, okay? She already thinks I'm getting prematurely senile for forgetting important things like her hair styling appointments and manicures. I tell you, just forget to mention how nice she looks one time, *just once*, and she tells you that you are getting old. And, 'I forgot you had an appointment today,' is no excuse in her book.”

They shared a laugh about Tom's sister. Like Bashalli she was stunningly beautiful, but unlike Tom's wife Sandy Swift-Barclay was still young enough at heart to be overly concerned with her looks at times.

When he arrived at his desk the next morning Tom had a call waiting from Bob Jeffers.

“Hey, skipper. I tried reaching you yesterday but Trent told me you were out at Fearing. Speaking of which, thanks, again, for the trip back up into space a while back. Felt like old times. The reason I called was to see if I can come talk to you about our Eris issue?”

“Sure,” Tom replied. “Is it serious?”

There was a moment's silence before Bob stated, “There might be... something. But, I really need to show you and your dad, if he's available, what we are getting from the Callippus and see if you concur with our assessments.”

“Come on down any time today or tomorrow, Bob. I'll make time.”

“Then, I'll be there in one hour with some files to project on your telejector system in the big office. Thanks for the quick opportunity.”

Trent showed him in as soon as he arrived.

“Sorry that dad can't be here, Bob. He's in the air on his way to Washington to speak with Senator Quintana and the President about what we intend to do. It's getting to be time to tell the world what is or might be about to happen.”

“Right. So, I'll get right to my presentation. Here's the data chip.” Tom took it and pressed it into the slot on one side of the conference table. Immediately a display of the Swift logo came up floating in the air over the table.

As they sat, Tom handed Bob the controller.

“Thanks. Now, this first series of photos are what we managed to get from the new telescope now it is in space.” He showed Tom the sequence pausing on each one about a second. “We've highlighted Eris and brightened up the white dot that is Haley's Comet. These were taken, by the way, every half hour over the nearly two weeks we had access during the testing phase. Now that it is back up there full time at the new station and completely operational, we are getting even better shots, but I'll get to those in a minute.”

The final frame froze and a line overlaying the image appeared showing the path of Eris. Another one soon appeared showing the path of the comet.

Tom was dismayed to see they appeared to intersect at one point.

“It that conclusive?”

“No. It was an estimate. Now, Let me switch to the new

images."

Again, only faster this time, the new photos showed the inbound path of the comet and the very slow orbit of the planet. This time the final frame zoomed in and Tom could see the two lines did not directly intersect.

"Close but no chance of a hit?"

Bob sat back and sighed. "We just aren't certain. Every day we get more information and every day we are refining it. Right now it appears the probably danger date is seven weeks from yesterday. Perhaps between three and eight in the afternoon or evening here in Shopton."

He paused but Tom could see there was more to be said.

"Go on," he urged.

"Okay." Bob sat back forward and leaned his elbows on his knees. "If they do come into close proximity as we believe, it will be at about the same distance the small moon is located. Around twenty-six or twenty-seven thousand miles above the planet. Maybe a little closer. If it passes at the wrong time, there is a chance of either collision with the moon, Dysnomia, or one or both of them, the moon and the comet, will shift their positions and orbits. We don't believe Haley's has enough mass to drag the moon out of orbit, but it is in such a close orbit as things stand that we fear any instability will need to be seriously corrected before it gets too out of hand."

Tom nodded. He explained about the *TranSpace Dart* and how it would have the ability to use the planet to push the moon back out into position if it were coming in and back in if it were heading out by reversing the repelatron and Attractatron positions.

Bob sighed. "That's great! Really, Tom, right now that is our biggest fear and our most solid theory based on the photographic evidence. You've taken a huge load off my mind. Wow!"

As they stood up, Tom mentioned the secret nature of their trip and the potential issues out beyond the known solar system.

Bob nodded but looked uncomfortable.

"What? What aren't you telling me?" Tom asked seeing his expression.

"It's just that... well, we are pretty sure that if the comet and the moon do not come into contact, they will influence each other. If it is the comet that gets the worst of it, there is no way for you to deflect it without possibly causing some problems

down the road. And, without any planet near enough to you, repositioning it on its right and proper path that we are now certain will be benign for at least the next eleven passes through the system, is going to be impossible. The bad thing is, we aren't the only ones who know about this."

Tom was stunned. "Explain that, please."

"We had to give up control of the telescope as per our agreement for a full day the other day and forgot to move it off Eris. The astronomer who took over made some observations and had already reported them to his own government, and we think it is just a matter of time before they blab it around. I'm sorry, Tom. We goofed, big time!"

The younger man shook his head. "It was going to come out fairly soon anyway, it is just I think our President wanted to be the one in control of that info. We need to call dad right away."

He had the Communications people route a TeleVoc call to his father's pin via his cell phone. After a terse, "Wait!" Damon's voice came into Tom's head.

"Yes. I'll suppose this is important."

Tom quickly explained the situation.

"What country had that information?"

Tom asked Bob that question and neither of them liked the answer.

"*Kranjovia!*"

"Okay. Tell Bob not to panic. I'll handle things here. Bye."

Tom passed on the message and Bob was about to leave when Tom's TeleVoc paged him.

"Yes, Dad?"

"The President is going to make the announcement in a press conference in eight minutes. He is a little angry that the information leaked, but when I told him any other Observatory around the globe might accidentally have discovered this same thing weeks ago using their own telescopes, he calmed down. So, no panic, but it is now vitally important that you get out there as quickly as possible. He needs to know if your schedule is still a solid one."

Tom replied, "We can by underway in six weeks and three days. No sooner and maybe one day later. Best we can do and do it safely."

"Fine. And, Son?"

“Yes?”

“Thank you for getting to me on this as quickly as you did. Good job!”

CHAPTER 12 /

TRANSPACE DART OUTBOUND

WHEN THE President made the announcement it was with a special "advisor" standing just behind and to his left.

Damon looked slightly uncomfortable being there and garnered more interest from the reporters in the White House Press Room than the Commander in Chief.

"Mr. Swift? David Becker, Associated News. Can you tell us what the worst case scenario will be? I mean, are we looking at worldwide death and destruction?"

The Presided stepped to the side and from the corner of his mouth told Damon, "Good luck with this bunch and do not go easy on them. If they ask stupid questions call them on it!"

At the microphone, Damon looked at the reporter. "First, let me state that *you* have put those words into this discussion. Neither the President nor I will use such terms because they are fear-mongering speculation at its worst. That is really the worst case scenario. But, you deserve some sort of answer or I am sure you will make one up. Here goes."

He took a breath and looked at the faces of a few other reporters who all seemed to be reorganizing how they would ask their questions now.

"There is a small planet out beyond Pluto named Eris," and he spelled it, "that nobody can really see. It takes more that five hundred and fifty years to orbit the sun, which shows how far out it is. Even if it were to suddenly stop in its orbit and head inward it would take nearly ninety-two years to get to the orbit of our own planet. By that time we could be anywhere in our orbit. We could be here, around the other side of the sun, or anywhere in between. If you can discover a way to calculate exactly where we will be at any give time that far out from today, then print that."

There were murmurs but he continued. "If in the quadrillion billion million to one chance, or whatever it is, that we were exactly where Eris is when the paths cross, it is a large enough body at least two-thirds the diameter of our own moon, which is about fourteen hundred miles, or up to two thousand miles across, so it would be catastrophic should it be a direct hit. Even *that* is a long shot. A glancing blow would be bad but possibly

not disastrous. The truth is we just do not know. *Nobody* does! If anybody tells you they know what is going to happen they are liars."

He looked directly into the cameras. "For anyone out there, if you have anybody tell you they know what will happen, or what you need to do, or what you ought to think about this, or if they try to get you to panic about something nobody can conceive of right now, walk away. Ignore them. Turn the channel to another station or put that newspaper or magazine down. What they tell you is all speculation."

He now turned and nodded to the President. "The President and I will be among the second and third people to know. My son, Tom Swift, and a small crew will be traveling out there as the President told you and will assess the situation. Only then will any true information be given, and I promise you that it will not be sugarcoated or run through spin doctors. It will be the truth as far as we can discern it, plain and simple."

He took one additional question from a woman representing the Chicago Tribune who asked about the ship Tom would be taking. "Is it his *Challenger* ship, because as far as I recollect that isn't fast enough to get out that far in even a few months?"

"While I cannot divulge the method of power he had come up with, I *can* tell you a purpose-built ship is currently under construction that will have the necessary speed to get to that point, or at least to a far enough point where more direct and accurate measurements can be made in under a month's time. And as I said, there is a window of a few months, so please be patient and do not try to whip up a good public panic, even if you believe you can win some award for doing it. It will be counterproductive and downright dangerous. Thank you."

He and the President left the podium and headed down the back stairs.

"That was pretty good, Damon. I'll have my Press Secretary hammer home that bit about anything else is a lie in the official release."

By the following day the Kranjovian government released a statement saying they were keeping an eye on the situation and would report to the world if the Swifts or the United States seemed to be keeping information from them, but that they had no direct evidence there was anything other than the stated situation going on.

When one news show in Germany asked the question of how long the Kranjovs had known, they were quick to state it had

only been within minutes of the U.S. announcement and they had in no way kept it from anyone. Then, they absolutely dropped the subject.

The next bit of news, good this time, came from Harlan Ames in Security who came to the office.

"I haven't exactly had a lot to do recently, Tom, but I did want you to know we've followed up on that leak in the *Bulletin*. It turns out Dan Perkins told the truth. He had no idea that was going to appear. It was his estranged wife's nephew who has since left the company and is under investigation by the FBI for bribing one of the people up at our Observatory."

"Oh, no! Not one of our employees?"

"No," the Security man said shaking his head. "The Perkins—sorry, I mean the *Abernathy* fellow, Lucien Abernathy, found out that a visiting astronomer was having a bit of money troubles from gambling debts down in New Jersey. He paid the man five thousand dollars, for anything that might embarrass the Swifts." Harlan laughed. "The man evidently owes fifty thousand so that was a drop in the bucket, but he copied a couple secret files and passed them along."

"Is he still there?"

"No. He is in FBI hands and has asked for protection so certain people to whom he is in debt do not get to him."

They both shook their heads over the stupidity of some people and the greed of others. Harlan left a few minutes later so Tom returned to his checklist for the trip.

Just about everything was in order.

Twenty minutes later Tom heard the tentative knock on the door. "Yes?"

The door opened and Chow came in, his ten-gallon hat clutched in his right hand. "Kin I talk at ya, Tom?"

He set aside the papers he was checking and pointed at the chair opposite him. "Sure. Take a seat. You look like a man with a lot on his mind. All good, I hope."

The westerner shrugged and looked slightly miserable.

"I hear how yer gonna head out on a trip beyond the edge o' the galaxy, Tom. That true?"

With a small but gentle laugh, Tom shook his head. "Not that far. Just a bit beyond the edge of our solar system. Anything I can tell you about it?"

“Naw, it's just that I gen'rally go on these trips with ya like a couple months ago, but lately I've been not goin' so much, an' I don't want ya ta think I don't appreciate goin' an’ all that, but this time I just cain't!”

Tom had been trying to find the time and words to let the big man down, but the ship wasn't going to have any room for him, even though they would need feeding.

“Can I ask why?

“Shore. Ya' see, Wanda, my wife, wahl, she's got this aunt out in Idaho who's not doin’ so well. Fact is, she's about on her death bed. Mebbe not right soon, but prob'ly in the next month or so. And, with you heading out soon I needed ta tell ya I cain't go with ya 'cause I gotta take Wanda ta see her aunt a'fore it's too late.” He looked up into Tom's eyes, his own glistening with the emotion he felt about letting his young boss down.

Tom reached over the desk and patted his arm. “You have to do what's right for your family, Chow. It is going to be a pretty tight squeeze for the people going, and although we need your great food, I understand.”

Chow brightened. “I kin make ya a whole load o' them heat n' serve meals like I've done fer some other trips. How 'bout that?”

Tom smiled. “That would be the most wonderful thing possible, Chow. Do you have the time?”

“I got four days and you only got two from what I hear, so I'll get right on it. Tell me how many people an how many days.”

Tom told him that meals for nine for a month-and-a-half would be the maximum they could take. "We ought to be back in just about four weeks."

Chow counted on his fingers and smiled. “Shucks! I kin do that by lunch tomorrow. And, thanks mighty, Tom. I owe ya one.”

“You just make us those great meals and we'll call it square!”

* * * * *

The nine-man crew—Tom, Bud, Hank, Zimby, Doc Simpson, Red Jones, Duanne and cargo handlers Art Mallick and Dan Stanley—took the cramped elevator up into the top of the *TranSpace Dart* and settled in.

With Tom and Bud in the control seats and everyone else downstairs strapped into the acceleration couches, and the four power pods putting out power, the ship lifted from Fearing Island at five-forty in the morning like a spear head, a full hour

before the sun would be up.

They still wanted as much secrecy as possible so darkness had been decided as the best time to leave.

With the main repelatron set at highest output, they accelerated at 2.3-Gs heading outbound for their rendezvous with the black hole they had re-parked inside the asteroid belt.

With that to rely on, and the hope they could manage things out at Eris' location, Tom's earlier plan to build a temporary push platform from asteroidal pieces had been abandoned. They knew that after getting a good start with the repelatrons the black hole would be their best source of motive power.

Even at high acceleration, with turn-over and deceleration the trip out took three days.

Then, maneuvers to get positioned correctly took slightly longer than anticipated when they discovered the black hole wanted to shift slightly from a position directly in front of them as they approached. It took Tom an extra hour to decide they need to sneak up on it from a distance as they had with the *Goliath*, a few hundred feet at a time, rather than just try to power in and grabbing at the hole.

"Got her!" Bud called out while Tom was busy with the fine control motors. "That's one slippery black hole, but it's in the ship's grasp now."

"Good. I really hadn't anticipated using any of our fuel at this point. Now we're down by two percent. I hope we don't come up short."

"Naw. You always put in about thirty percent more than you ever think you'll need. Plus, now I'll be extra careful how I use the attitude controls."

Even though everyone wanted to get going, Tom called a five-hour rest break, settling into the pilot's seat. They'd been under acceleration or deceleration for most of the previous seventy hours plus the recent maneuvering time. Everyone was tired and soon fell to sleep in their various positions.

The next thing Tom knew Red Jones was tapping to sole of his foot. He looked over his right shoulder and down the ladder where the older pilot was standing, his head just under the floor level.

"Time to move your carcass, Tom. Zimby and I will take over for you and Bud and you two go below and grab some of Chow's food. I can recommend the packages labeled 'low gas vegetarian

stew.' I hope it works as advertised. Then, take a nap."

"Yes, daddy," Bud said as he slipped out of his seat.

The two young men were down the ladder in a minute and Red and Zimby had strapped into the seats. The plan was to not get underway for another hour but Tom hated not having someone posted up there just in case.

Bud called up some special corned beef hash with diced beets that was a particular favorite of his while Tom took Red's suggestion. Both were happy with their choices.

The time to get underway came and Tom climbed the ladder to give Red and Zimby instructions.

"Just maneuver us in to the magical distance and then let's give things a jump start with about ten percent repelatron power shoving back against the Earth. It's still in a good position for us. Trust the computer to keep our relative position from the hole at the correct distance, but drop it and get us the heck away if we should suddenly start to head into it."

"Not to worry, skipper. Zim and I will take things slow and easy. You get some more rest and by the time you come back we'll have her up to, oh, least fifty miles per hour, I'd say!"

He smiled down to his boss.

"Just don't go much faster or the horses will get scared," Tom cautioned them before heading to his small room.

He climbed out of his over clothes and slipped into his bunk wearing only the gravity undergarment that would no longer be required in a few more minutes as soon as the gravity field was stable.

When he awoke and checked his watch, it was only three hours later but he felt refreshed. He stood and flexed his legs delighting in the sensation of zero movement even though he knew they would be traveling at an increasing rate of speed, at what would have been, perhaps, as high as 3-Gs by this time.

Hank and Duanne took the next turn at the controls after Red and Zimby had been up there six hours. To everyone's astonishment they already passed Jupiter and were nearly to Saturn by the time Tom and Bud came back on duty.

Slipping back into the seat and tightening his harness Bud asked, "How fast did they get up to, Tom?"

"It appears we are traveling along at about point-seven-two percent the speed of light and have been for about one hour. Wow, or as you would say, Jetz! We're going to have to get

serious about computing the necessary turn-over point and then start those maneuvers if we don't want to pass our target."

He took a sly look over at Bud.

"Of course, we always could slide past that extra several million miles and then come in behind Haley's Comet. Give it a little nudge out of the way? What do you think?"

Bud's head tilted to the side as he tried to decide if it sounded like a good idea. Finally, he stated, "If it is all the same to you I'd rather get into a safe position with plenty of time to spare and just wait. I'm pretty sure while we sit out there we can occupy our time with watching the comet's path and trying to decide if we're going to be in trouble."

Tom nodded. "Yeah. You're right and that's a smart choice. So it's on to a holding position behind the orbital path of Eris. According to the last data provided by the Observatory either the comet is going to pass ahead of the planet or just barely behind. They're fairly certain it will be out front but only be two or three hundred thousand miles. Awfully close."

"Remind me again how close it will need to get to be pulled off its normal course."

Tom brought up some data on one of the auxiliary areas of the control screen. He linked it to his tablet computer, sitting in his room below, and tapped the screen a few times.

"Well, based on the information from Bob, as long as it remains a quarter-million miles away there ought to be no influence from Eris. Closer and there is a sliding scale of possible deflection from its course."

They sat in silence for a couple minutes while Tom did some calculations.

"It would appear that as long as it doesn't get closer than around two hundred thousand miles that we can brace against Eris and give it a tiny shove back into place. Let's hope that's all we have to do.

By the time it came for Red and Zimby to spell them, Tom had computed the turn-over point. It would come three hours and fifty-eight minutes into their watch. He also had plotted the entire maneuver and it was in the computer.

"Unless something strange happens you should be able to call up maneuver ZZ-Nine from the menu and it will do everything. Of course—"

"—Call you if things don't go exactly to plan. Got it, skipper." Red smiled at his boss. "You don't half worry all of the small

stuff, do you?"

"Come on, Red," Bud said as he got ready to vacate his seat. "If the skipper here didn't sweat the small stuff he'd be concentrating on all the big stuff and you know that's what you and Zimby and the rest of us stick jockeys are on the payroll for!"

"Forgive an old man's forgetfulness. So, Tom, you and Bud have fun and I'll call down if anything goes off the path."

Tom thanked the man. Red was right, and the inventor knew it. The reason he and his father employed men like Red and Zimby, and even their newest test pilot, Deke Bodack, was because they could be counted on to do the right thing and to not try to fool their way through anything.

If Red needed assistance or information, he would ask for it without hesitation.

* * * * *

Back at Enterprises, Damon Swift had his hands full. The Presidential Press Secretary felt so completely overwhelmed with requests for information about the day-to-day and even hour-by-hour situation that he finally informed the President that either someone else take responsibility or his resignation would be on the desk in the Oval Office in five minutes.

A call directly from the President to Damon had placed the burden on his shoulders but with the advice and agreement that if Damon wanted to tell reporters to jump off a cliff, he had permission to do so.

It was tempting, but he mentioned to Trent as his secretary assisted him in drafting a statement to be sent out to everyone, "It's an acrobatic balancing act, Trent. Too much info and the reporters will tear things down to the ground, and too little and the Government looks like it is hiding something. I don't want us to be a hiding place, so let's see what you have so far."

Trent read:

> At the personal and official request of the President of The United States of America, Damon Swift of Swift Enterprises (Shopton, NY) and other business entities has taken the task of providing semi-weekly updates on the situation regarding the exo-planetary body, Eris. Please be advised that these communiqués will be issued on Monday and Thursday afternoons at approximately 2:00 pm EST and will contain all NEW information discovered, computed or observed since the previous release. No recap will be provided; it will be up to news agencies to keep copies of all previous releases for reference.

As of the date and time appearing at the top of this release, here is what is known to be factual:

1) Eris and its moon, Dysnomia, orbit the sun in a non-circular orbit at a distance averaging approximately 68 AU (1 AU is the distance of the Earth from the sun). It takes nearly 558 years to complete a single orbit.

2) Eris is between 2,320 and 2,402 kilometers in diameter. A closer observation is being undertaken and the results will be posted in the next release.

3) Dysnomia is between 280 and 420 kilometers in diameter and this will also be updated once close observation has been finished.

4) Swift Enterprises is undertaking a manned approach to Eris and Dysnomia and will be at that destination tomorrow, Friday. The mission is under the command of Tom Swift and includes a crew of nine pilots and specialists.

5) Haley's Comet is now known to be on a close pass track with Eris. How close is unknown as of this release. Speculation is useless until closer observation can be undertaken (see 4, above)

6) Much data is available on Haley's Comet and will not be repeated here.

7) No matter what occurs at, near, or around the planet, Eris will not do anything that could come close to the Earth for a minimum of 36 years and up to 98 years.

The President asks that no speculation be made by any news agency or individual. There is not enough information available to make even an intelligent guess.

Anyone or any entity making a guess that causes undue panic will be held responsible by the world courts and United Nations.

"Looks just like I wanted it to. Thanks, Trent!"

CHAPTER 13 /

“GEE, IT’S STILL BRIGHT WAY OUT HERE!”

ONE OF the first things Bud noticed was how easy it was to see the planet and also its much duller companion, the little moon, Dysnomia, even though they were nearly a quarter million miles away.

“Hey, skipper? I just noticed how bright it is all the way out here. What's going on? I figured at this distance we'd be seeing ghostly shadowy things and not a nicely lit planet.”

Tom nodded. “Yeah, and I'm very happy about this. Oh, and it’s not naturally like this, by the way. You see, I had the cameras outfitted with special low light lenses and then added correction algorithms to the computer processing. What we are seeing on our screens is about a fifty times increase on the actual amount of light reflecting off things out here.”

Bud looked at his friend. “So, we're not using anything like your underwater lights that illuminate things like the dickens?”

“No. Just sunlight and the incredible amount of starlight that makes it to here. If we were looking directly at that we'd probably barely see the planet and never catch a glimpse of the moon. Bob at the Observatory told me that Eris has apparent light about half that of Pluto and the moon is a factor of six or eight times dimmer than that.”

Doc, who was standing between their seats asked, “Why is that? It isn't as if the moon is that much father out than the planet, is it?”

Tom smiled. “You see, Doc, only part of it is how much light gets out here. You should know that our eyes only see reflected light. At least in our normal spectrum of vision. Obviously bio and natural luminescence are different, but let's forget about those for the moment.”

Doc nodded. “Okay. I can live with that.”

“Good. So, here we are with two objects in front of us, both receiving the same level of light. But there are two main differences among a myriad of total differences. Those are that one is much larger than the other so it has a lot more reflective surface, and the other comes down to color. Dysnomia's surface is considerably darker than the planet. In fact, that tells me they did not have the same origin and the moon most likely was

captured by Eris at some point."

"Okay," Doc said slowly as if he was digesting this information, "so tell me where it came from."

Now, the inventor laughed. "Can't. At least not specifically. But I'll give you a guess once we or somebody gets out here and takes a leisurely look at all the other distant planets and planetary object that are only now being identified and tracked, we might find a material match for one of those and Dysnomia. If I had to take a guess I'd say something like we do know one called Houmea is sort of shaped like a gelatin capsule and spins around a central axis. At some point it might have spun off a small chunk that ended up, purely by chance, orbiting Eris."

Doc looked at Tom and crossed his eyes giving him a little smile. "Okay. Enough of that for this doctor. I'll leave the vagaries of the planets and celestial bodies to you and just concentrate on the vagaries of the human body."

He slipped back down the ladder and was replaced by Hank.

"Time for shift change, skipper. And just so you know, I have Doc's permission to tell you he is worried you are not getting enough rest. So, unstrap yourself—you, too, Mr. Barclay—so that Zimby and I can take over."

"Do you ever get the feeing that Hank has a problem with being direct about things?" Bud asked Tom as he pressed the button that unlatched and retracted his harness.

"You know," Tom replied as he copied Bud's actions and prepared to follow him down the ladder to the living area, "I do believe you are correct."

"Smart aleck!" Hank said as he climbed up the twelve rungs and slipped into the left, the main pilot's seat. "Oh, skipper?"

"Yes," Tom called back up.

"When do we need to be vigilant about the comet?"

"According to everything I can figure, we have twenty-nine hours to go before we can make the definitive observations and five more after that before the closest point of approach."

"Okay, Just wanted to make sure we didn't have to wake you too soon. See you tomorrow."

"Goodnight, Hank."

As he and Bud sat eating down on the lower level Bud looked at his friend and asked, "Did I see more than a few looks of concern on your face while we were up in the control room?"

Fork midway to his mouth, Tom paused and set the food back into its container. Before answering he took a look around, the only other person on the level was Doc and he was engrossed in a medical journal on the opposite side of the circular room.

"Yes," he finally answered in a low voice. "I was taking occasional bearings on the comet as well as receiving a few updates from the Callippus at the space station. It's not looking very good at the moment."

"Why? We're not in any danger are we?"

Tom shook his head. "No, but the CPA, closest point of approach, is looking to be pretty narrow. Perhaps as close as ten thousand miles, and that puts the comet inside the moon's orbit. They will still probably miss, but the comet may have enough gravity of its own to disrupt Dysnomia's orbit. I'm pretty glad we decided to bring up those two mules. We might need them both to wrangle the moon back into its proper orbit. That's the other thing I've been plotting."

Bud looked confused. "Dysnomia? Is there something wrong with it?"

"No, Bud, it's just that all indications have shown it is supposed to be in a circular orbit around Eris, but I'm now almost certain its apogee is about two thousand miles different from its perigee."

"So," Bud began as he tried to sort out his thoughts, "that means we need to get that right or… or what?"

Tom shrugged. "I don't know. I'd love to say it doesn't matter and that a circular orbit isn't going to inconvenience anyone or anything down on Eris, but without soundings and a very detailed understanding of the density and arrangement of the inside of the planet who knows if that slightly oblong orbit isn't necessary to keeping Eris rotating smoothly?"

"So, we really need to put the little guy back just the way we found it once the nasty old comet has gone bye-bye?'

Tom grinned. "Yeah. Just that, Bud. Just that."

After they ate Tom spent another five hours on the computers plotting everything he now knew about the orbit of the moon and also the rock-steady rotation of Eris.

That last bit surprised him. Cold objects rarely rotated with the smooth precision of those featuring some sort of liquid core whether that was molten or, as in the case of the gas giants in the solar system, a sludge of super cold yet fluid gases.

"Could that mean Eris has a liquid center?" he asked his father on their next communication.

"Well, it might at that. Planetary physics isn't one of my strong points, but I will ask the folks who do know and get back to you on that. But, this extremely tight CPA is worrying. More so than getting that little moon back into a precise orbit." He told Tom about the official news release that had been sent out five hours earlier.

"Do you believe I will need to amend that before the next scheduled release, or should we just wait until Haley's passes and then tell the people what happened and what is being done, if anything?"

Their talk was via radio only so Damon could not see Tom was rubbing his chin in thought, exactly as Damon was currently doing himself at that moment.

"With so many unknowns I'd say wait. Nobody else knows how quickly we can communicate so you can play against the many hours it takes to get messages back and forth. If anyone tries to pin you down, tell them I misunderstood one of your info requests and it took nearly a half day to straighten that out," Tom offered.

Damon chuckled. "I don't think it will come to that, but you shouldn't need to take the hit. *If* it comes to that, which I doubt it will. Change of subject, but do you believe you have what is needed to fix the moon's orbit?"

"Yes and no. I think I can do it, even though it might take a week or more of tugging and pushing before we get it right. Dysnomia may be small but it is heavy. Bob tells me that if it weighed half of what it does we could probably let it be pulled away from Eris without any bad effects. But—" He left it hanging like that.

When his father's part of the message came back, it was with, "Yes. Bob is correct. Well, my advice to you is now that you know you can travel out and back quickly just get that moon into some sort of stable orbit, circular if needs be, and come home. We can come up with something else to outfit your *Dart* with to do the fine tuning and send you all back in a month or so, once public opinion moves on to the next great thing."

"Right. Okay, Dad. We'll not try to do it all at once. I'll call you again as soon as we have solid information about what happened and the video to send in. I'd rather not send that in real time just in case."

“I agree. Good night, Son.”

Before turning in Tom asked the pilots to plot a course to keep them half a million miles behind the planet’s orbital path.

“Once we get set release the black hole and keep a good close eye on it. I believe it will behave and stay where you put it, but if it looks like it is trying to move off, grab it again.”

They agreed to have one of the other crew members come tap on his door to give him the news of success or not. When it came, eleven minutes later, it as all positive.

“Hank told me to say it is staying put like a very well trained black hole, skipper. Plus he said to tell you the new angle is giving him some better sighting of the comet and in a couple hours he is fairly certain he can give you an accurate CPA.”

“Thanks!” Tom rolled over and drifted into sleep, but it was a fitful one.

His brain could not relax enough. He was tense from the self-imposed pressures of getting things right, and his conscious mind could not convince him that he and the crew were already doing everything they might.

He jumped out of his bed twenty minutes later when a thought hit him.

“Hank!” he called out as he climbed the ladder and poked his head ho into the control cockpit.

“Yes, and aren’t you supposed to be sleeping the sleep of the right and just?”

“Can’t. It just hit me that instead of sitting here waiting for the comet to get to us, why don’t we just move out and give it a little extra shove?”

Hank and Doc started to laugh.

“You just missed a call from your father,” the physician stated. “Let me play that for you.”

“Tom, it’s dad. Listen. I just got off the phone with Bob Jeffers on a detail that came to my mind. I was thinking about the possibility of you making a preemptive shove on the comet to make certain it will not give any trouble. He set me straight on something I had not considered. Haley’s Comet, while it is out that far, is at nearly absolute zero. That means it is so fragile that anything above a gently rap with your knuckles might shatter it. Or, break off a piece. In any case he strongly suggests not approaching it. You could do more harm than good.”

Tom waited as his father sounded as if he were reading something.

"Okay. He just sent in some more data. If the comet breaks apart it will alter its trajectory and come in on a more direct line toward an eventual destructive dive into the sun. But, and here's the bad part, Mars will be smack dab in the way of all those pieces when they pass. More precisely, they believe the small moon of Mars, Deimos, has a good chance with its low orbit, of being in the wrong place at the wrong time. So, just leave the comet be and take whatever actions are necessary once it passes. Sorry for the long-winded piece, and you certainly do not need to respond other that a blip to say it was received. Enterprises, out!"

Tom made a small huffing sound as he puffed his cheeks out and let the air escape.

"Okay. Forget my last. If dad says to leave it be, we don't try anything. I only hope that chance and timing are on our side."

"We do too, skipper," Hank said over his shoulder. "Now, go back to bed. It's going to be your turn up here all too soon and everyone knows that once you climb into this seat you won't give it up until the blasted comet passes."

Tom eased back down the ladder and started to turn around only to come face-to-face with Bud.

"I just want you to know that your lovely wife, my sister-in-law, gave me instructions on how to handle you in a situation such as this one. She told me to tell you that you are to climb into bed like a good little inventor, think lovely thoughts about her, and get the sort of sleep you keep depriving yourself of."

"Sure, but—"

"Sherbet is a desert. Not an excuse. She also told me to tell you that your, 'I can get sleep on the way home,' is not acceptable to her. So?"

Tom laughed. "So, I go back to bed and stay there for at least the next," he looked at his watch, "five hours and ten minutes. Tell her I was a good boy when we get back."

"Yeah, mostly. The bigger issue is I can't sleep while you are not sleeping. So, do us both the favor?"

"Right. And, thanks, Bud. Like everyone else here you've got my back. I do appreciate it."

Tom not only slept the rest of his time off, he had to be awakened twice.

He stopped to have a full cup of coffee and get a refill before climbing up the ladder to the cockpit.

"Is anyone interested in having me take over?" he asked by way of an offer.

"We have nine hours to go until the CPA," Hank replied. "Neither Doc nor I are particularly sleepy right now, so why don't you stop and have some food before coming back up. I want one more set of sightings before I give you what I have on our cometary friend or foe."

He climbed back down and headed for the kitchenette. The menu card featured thirty dishes appropriate for most meals but his stomach wasn't telling him it was much interested in having anything come down at the moment. He knew he was hungry; it had been more than eleven hours since the last time he ate, so he selected coconut oatmeal after seeing it was still morning on the ship as well as back home in Shopton.

Bud was already there enjoying what appeared to be an omelet of some sort.

"I tell you, Tom, Chow does some wonderful things with food, even the stuff that gets frozen for these trips."

They sat in silence finishing their food then headed up to take over the controls.

"Okay. I have news both bad and also not so good," Hank said. "What do you want first?"

Tom finished climbing so he was now standing shoulder to shoulder with the big Engineer. "The slightly bad first."

"Okay. The really bad part is the Comet has slightly altered its course making all my previous sightings nearly useless. The not so good news is it could now pass just behind the planet, but close… maybe five thousand miles. Which brings me to my disastrous news." He took a deep breath. "Dysnomia will be just about right in the way if that is where the comet passes."

Tom's heart sank and he felt dizzy. Luckily, Bud was behind him and pushed up into the inventor's backside keeping him upright.

"Rats!" he said. "Okay, hop out and let's see if we can wiggle past each other. If not I'll climb into Doc's lap and let you out."

With Tom moving as far toward the control panel and Hank climbing over the right side of the seat they swapped positions. Tom slid in, harnessed up, and looked at Hank. "So, tell me what I'm going to be seeing."

Hank explained the course shift that had come three hours earlier.

"I didn't want to wake you because it would have been to tell you we didn't really know much of anything other than a possible measurement anomaly. Now, we sort of do, but my guess is in the coming seven or eight hours it will all become very clear."

"It's okay, Hank, and you too, Doc. You're right and I would have lost sleep over nothing I can control. That's a pretty helpless feeling and one I don't like, but if the experts back home say don't touch, I guess we don't."

When Bud swapped positions with Doc he looked at the new probable trajectory and shook his head.

"Poor, little Dysnomia. You can't begin to imagine what is about to slap you on the backside."

Bud worked over the following hour with Duanne to reroute some of the screen data from the cockpit to the monitor down on the lower level primarily used for movies and television shows. Tom has said he wanted every member of the crew to have the chance to see what was happening, and it was useless to try to get more than one extra person up in the cockpit.

It gave him something to do, and deep down he understood that Tom would feel obligated to explain what *he* was doing if Bud had been up there all the time.

Duanne proved to be a magician with getting the signal down two levels, wirelessly, and through the hull and floors that were coated in tomasite. He had fashioned three small transmitters from some spare parts, attached small batteries to them, and stuck them strategically so the signal got to the monitor strong and clear.

Everyone was wide awake several hours before the pass or strike, and with the exception of Tom and Bud upstairs were in their couch seats on the lowest level, their eyes glued to what the cameras were picking up.

Using split screen Tom was feeding them a shot of the telescopic view of Haley's Comet on the right and the planet with its sad, small moon on the left.

For some reason the comet had picket up a slow roll to add to its end-over-end tumble. Tom considered for a moment that this might be the cause of the course change, but they would never really know.

Everyone watched, aghast at the sight, as Haley's comet grew closer and closer until it was on just the one camera fifteen seconds before it smashed into little Dysnomia—Eris' three hundred-eighteen mile wide moon—the comet split into two pieces near the center point and then shattered into millions of small glass-like shards spreading out like a slow-speed special effects explosion.

But, the worst thing was that while Dysnomia appeared to have suffered little physical damage other than some rising dust from the surface, it began rapidly dropping from its orbital height of more than twenty-five thousand miles, and at an increasing rate. Twenty-seven minutes later came the collision.

“Oh, no!” Bud groaned. “Look!”

Everyone could see what the impact had done. Eris, without benefit of having a dense atmosphere, took the impact at full speed and its crust seemed to crack and shatter. Deep inside the shell of the planet, and to Tom's surprise, dull orange molten rock could be seen.

As they watched, the glow became more and more evident as large fissures appeared all over the surface of the planet.

Then, slowly, the planet began to expand. It wasn't much at first, but the instrumentation on the *Dart* measured it.

Eris had, in the fifteen minutes since the impact, expanded by more that a quarter kilometer.

“If that continues,” Tom said in an awed whisper, “the planet could very well break apart!”

CHAPTER 14 /

RETURN TO TRY SOMETHING ELSE

INDEED, they watched over the following three hours while the planet continued to expand. By that point it had grown by more than nine kilometers and although the rate was not increasing, it was obvious to them all that Eris was on its way to breaking up.

Under normal circumstances it would still be several hours until a radio signal could reach the Earth, but thanks to their Space Friends, the Swifts had access to several of the alien's nearly instantaneous transmitters. So, Tom's signal to his father sent twenty minutes after the impact had been answered in just two minutes.

Their conversation was filled with lengthy pauses, but along with a two-way dialog, Tom was sending continuous video for Damon and a team back at Enterprises to watch.

Over the next hour the following conversation occurred.

“As you can see, Haley's hit Dysnomia with enough force and with enough mass and inertia to send it crashing into Eris. That seems to indicate it was just barely holding in its orbit, which tells me there is a possibility this only accelerated the crash into Eris. Unfortunately, and possibly because of the incredible cold out here, the surface easily fractured and the heat that I still can't believe the core has inside forced things apart.”

“We can see that, Son. Nobody back here can come to grips with the images even though there is irrefutable evidence of exactly what has happened. And, you say the planet is expanding?”

“It is, Dad. Not fast, but it isn't slowing down. The molten core is visibly cooling and the dull orange glow is fading. I am hoping that as that solidifies it will hold onto everything. The planet may never be the same, but at least it will be one larger object.”

“Do you see anything you can do about what is going on?”

“No, not really. Without anything to push against we can't try to force some of the larger chunks back in tighter, although that would be ideal. Ditto the two mules we brought out here. They are pretty useless at this point. What we hoped to do with them just happened too fast for us to set up for. It was almost as if the comet was redirected into Dysnomia. Weird!”

“Perhaps not so, Tom. A couple of the planetary scientists we have up from Washington tell me that it points to both the heavy-for-its-size density of Eris as well as some other forces. One of them believes there might be another nearly invisible planetary body out there that the comet got too close to years ago, and the spin you saw was a result of that interaction. That spin is new to astronomers. It may have allowed the comet to sort of curve into Eris.”

At that point Bud commented to Tom, “I thought you had to have air friction to cause a curve ball.”

Tom nodded, but then shook his head. “No, in fact there is some belief in the scientific community that the more spin an object has, the more readily it can be affected by the gravitational pull or even magnetic pull of a larger object. This might have been the proof of that theory. We'll never really know, but it could be some sort of explanation.”

To his father on the radio, he said, “Whatever the cause, we are all surprised that the comet had that much effect on Dysnomia, although we concede that it hit exactly at the worst possible spot in the worst possible orbital location and did the worst possible damage. We are going to see if there is any way to do something, but will most likely head home pronto in another few hours. I have a rough idea but can't do anything about it out here with what we have.”

“I’ve just been sent a message from Bob Jeffers. He asks that you perform a good, sector by sector scan of the area outside the orbit of Eris. Mostly in a thirty-degree arc of its path. The want to see if there is a small and very dark object out there that could have caused the curve. Don’t spend more than a day doing it, but if you see something, try to get any tracking data you can.”

“We’ll do that, Dad. Then we’re coming home to outfit for a better try at fixing this damage. First, and while I have others doing the scan, I have something I need to try while we are still out here.”

What the inventor wanted to try was a long shot, but about the only viable thing he could think of.

By carefully positioning the *Dart* over one of the largest single pieces of the planet Tom launched their two mules and positioned them in between the ship and the planet. Then, with a lot of adjusting and maneuvering, he activated the Attractatrons on both the ship as well as the mules.

Now, with the ship locked to the planet and the mules locked to the ship, he used their repelatrons to shove down at the

planet. Higher and higher the power settings went until everything in the mules was running at one hundred-and-five percent of normal maximums.

It was working, ever so slightly, as witnessed by the fact that the one large sheet of crust the mules were concentrating on—not the same one the ship was locked onto—stopped moving away and even shifted slightly closer to the body of the planet and its normal position.

An hour later both Mules shut down as their power systems overheated to the point of near destruction.

The piece of the crust, some eighty miles across, was now nearly six hundred meters closer to the rest of the planet than it had been, and seemed happy to remain in that proximity. Unfortunately, everything else continued to expand out.

That, he thought, was very strange as it meant the gravity of the planet was insufficient to bring things back together.

Hank reported an hour later that there was "something out there" they could not directly see, but it was paralleling the orbit of Eris and only a few million miles farther out.

"Whatever it is, is dense, skipper. More so that Eris and at maybe a tenth the size. Zimby asked me if that might be the reason Earthbound scans show Eris is heavier than it actually might be. You know, what with the breakup happening we both came to the conclusion it must be a pretty lightweight planet after all."

"I think that's what the folks back home are thinking as well, Hank. Good job. Did you get enough data to know how it is tracking?"

"It seems to be quite happy to just sort of hover out there. It certainly isn't coming closer, but get this… the comet must have passed really close to it. Could that be why it curved into the moon and Eris?

"That's the prevailing opinion, Hank. I'd say you pretty much just proved that. Button things up. We'll be heading home in two hours. I'll be up in twenty minutes."

It was impossible to recall the mules in their present deactivated state and so Tom elected to abandon them in their present wide orbit around what had been Eris as the *Dart* prepared to return home.

The black hole that had eventually been parked fifty thousand miles away was still there and Tom risked using the ship's

repelatron drive against the planet core area to shove them back out so they might reclaim the hole.

The maneuvers took an hour, but with Bud's steady and now well-practiced hand on the control stick both ship and black hole were quickly locked back together.

Now it would be necessary to use the attitude rockets built into the fins to spin them back around so they could head home.

Fortunately, the ship still carried ample fuel for this purpose and the *Dart* was moving away from the planet a half day after the collision.

“Everybody stand down and take a break,” Tom announced to the crew from the cockpit.

Duanne came up the ladder with a worried look on his face. “What about you, Tom? You look beat. Why don't you let me take over for a couple hours. I think I've picked up enough from watching you and Bud to not get us into trouble. Everyone else has been up and alert and working for something like twelve to twenty hours. I'll pretty much just watch the dials to see that we don't overheat and that the stereo system is working.”

Tom sat back and realized that he was more mentally exhausted than physically, but either of them was reason enough to go grab a nap.

“It's a deal. Bud, make sure he understands to not press the self-destruct button and then you hit your bunk as well.”

Tom got up with a grin on his face that Duanne could not see. He had a silent chuckle, in spite of the circumstances, when he overheard Duanne ask Bud, “Surely we don't really have a self-destruct button? Do we?”

The last thing Tom heard after maneuvering past the electronic man was Bud telling him to not worry… “too much. It only comes on if you fall asleep at the controls.”

Most of the crew were entering their individual rooms but Tom and Bud headed for the lower level and food.

“It seems we’re in a rut, skipper,” Bud commented as he ordered up some hot chicken casserole. “Work, eat, sleep, do the bathroom thing. A rut.”

Tom grinned as his macaroni and cheese bowl came out of the radiant oven. Yes, I noticed that. Maybe next time we bring the wives?”

Bud blanched. “Forget I said anything. Can you imagine me and Sandy cooped up in this super-sized pointy tin can for weeks

or months. She'd insist we put in a shopping level and maybe even a manicurist."

Once finished with their meal, Bud went to bed while Tom placed another call back home. It would be near midnight but he had promised a report to his father once they were heading back. The Communications operator at Enterprises routed his call to the Swift home phone.

As he waited for the time-delayed answer, he thought over what they now knew and what they did not.

"Son? It's dad. I take it from the lateness of the call this is a report to say you're on the way home. So, I'll keep quiet and let you send it. If you don't need any answer from me at the end, just say, 'Nothing more,' and then go to bed. I'm guessing at this, but you've most probably been up most of the last day. Go ahead."

Tom dictated a four minute report including the measurements of the dark object. To that he added, "I'm fairly certain it is not another black hole, Hank did say there is darned little reflected light off it, but once the gravity scan locked on it he could just barely make it out on full magnification. Ask Bob or some planetary geologist but it could be almost pure, back carbon to be that dark. And, it would most likely have some sort of dense center like iron or even lead.'

He finished with a personal message to be given to his wife plus his love to his mother.

By the time everyone got back up nine hours had slipped past and the ship was up to .47 light speed. It had passed the orbit of Pluto and was nearly on a perfect course back for the Earth.

Duanne looked dazed but awake.

"It's beautiful our here," he stated, "but about as exciting as watching paint dry. How do you manage to stay alert? I had to keep slapping my thigh so the stinging would keep my eyes open."

"Sorry, Duanne. Usually there are two of us up here so we talk a lot, but there are also things I can do on the computer like trying to figure out what I'm going to do with this ship to get her ready for the next time out. Speaking of which, I'd love to have you come out with us again if you are free. We'll be back home for about nine days, maybe ten."

As he rose from the seat and arched his back, Duanne grinned. "Try to keep me back home. Now you've let me have a taste of space, boring as some of it is, I can't imagine being stuck

in a chair each and every day ever again."

He headed down the ladder. Tom called down to him, "If you want, I can see if there is a place for a good electronics man up at the new space station. More things to do and still you are in space. Think about it.

Bud slipped into the other seat three minutes later. "Sorry. Line at the bathroom," he explained.

Tom took a star reading and let the computer tell him the ship needed a small correction. He gave the data to Bud who keyed it in. Seconds later the muffled sound of the maneuvering rockets could be more felt than heard through the hull as the ship's rear end swung a degree and a third to one side and a quarter degree "down" based on the plane of the solar system.

"Now on new course for home. It'll feel good to get into some fresh air and larger quarters."

Tom agreed.

This time inbound he decided to put their black hole into an orbit around Mars. It would be more convenient and cut perhaps two days of the transit time going back out.

"Haz Samson at the Mars colony is going to keep a good eye on it for us," he told his father.

The day after arriving back in Shopton Tom had to face a group of reporters. It was at the specific request of the President that he provide some details of what had happened and what to expect. But, as he had been briefed, "Don't go telling them specifics. Keep up the 'We'll only know once we get back there so don't try to second guess us,' answers."

One man, looking as if he were trying to blend in and be invisible to Tom's left, was Dan Perkins. He was definitely not on the invited list that had come from the White House. That list was about fifty-three persons, each one told to bring portable sound and video equipment as there would be no extra seats for camera and sound crews.

Perkins, was a special invitee by Damon Swift who had explained, "Dan is such a beaten man that Doc suggested it might be in his best interests to get an invite. It appears that our Mr. Perkins is having some pretty serious emotional problems stemming from that article by his nephew. I hope you don't mind. He has promised to just sit and listen."

Tom smiled. "If Dan is that badly off, then I have no

problems. As long as he remembers this favor in the future."

The news conference, scheduled for a half hour, had gone on for nearly sixty-five minutes. Tom's carefully thought out report was concise but lengthy, and he only took six questions at the end.

The reporters went away with more information than they could have imagined and the old saying that the way to shut up a reporter is to tell them more than they can handle seemed to have come true.

Before leaving the podium, Tom looked at Dan and made a head move to tell the man to come over to see him.

Everyone else filed out and were taken back to the main gate by Security. Dan remained behind before coming over to see Tom.

"Did I do okay?" he nervously asked.

"Dan, you were just fine. I wanted to tell you I hope this is a start of a new era of our working with the local press and to give you a heads up. It will be an exclusive for you but one with a pretty heavy cost. I am going to arrange to have a video segment delivered to you once we get back out there. It will be for you to use in preparing a story and also for you to return to Enterprises once that story is written. You will not broadcast it, neither will you copy it. The official release of the video will come exactly five hours after Harlan Ames brings the data card to you and will go back with him after you have watched it twice."

The nervous sweat that had been on the newsman's face now stopped and his entire body seemed to relax.

"You've got it, Tom. I'd tried living up to the law these past six months and it was only because—"

"Forget that for now. Let's call that water under the bridge," Tom offered and reached out his left hand.

Dan Perkins shook it like a man who was on a new path and would not want to disappoint the Swifts.

The *TranSpace Dart* was undergoing a through cleaning and refit with a few new electronic items and additional fuel tanks situated inside the hull in places that had previously been mostly empty. The extra would allow up to one additional hour of maneuvering, and Tom believe it would become necessary once they started trying to put the planet Eris back together again.

"All the King's horses, huh?" Bud quipped as he and the

inventor sat having lunch in the large office on their third day back.

"What?"

"Humpty Dumpty sort of thing," the flyer explained. "You know, 'All the King's horses, and all the King's men?'"

Tom's shoulders slumped. "Gee, I hope we can get Eris back together again," he said glumly.

"Can I change the subject? Something hit me last night and I couldn't come up with the answer."

"Go ahead."

"Okay, so what happened to Dysnomia?"

Tom stopped eating and stared at his friend. "Say that again, please."

"What, after it was knocked out of its orbit and hit Eris, happened to Dysnomia? I don't recall seeing it, not that I ever looked for it."

The inventor set his silverware down and leaned back, closing his eyes. Eventually he said, "I have no idea. I never thought to look for it. We all saw it hit Eris and it did not disappear, so it must have ricocheted off somewhere. But, where?"

He called to the team members from the voyage and asked each of them if they recalled seeing Dysnomia. The resounding answer from everyone other than Doc Simpson was, "No, not a clue."

Doc, on the other hand, told Tom that he had kept a brief watch on the little moon.

"In medicine it is the small, sometimes insignificant stuff that comes back to bite you. So, you learn to look at little things. To use a Tom analogy, that time you took a bullet to the shoulder, I found the big piece and other surgeons would have as well, but a little research before I cut into you told me to expect a tiny piece at the back to break off. A manufacturing defect. I looked for it and it turned out to be lodged in a very bad place, one that could have cut into a major artery if it moved."

"Don't keep me in suspense, Doc, What did you see?"

"I saw Dysnomia bounce back just fractionally off the surface and sort of roll around the planet as if stuck by gravity, but by the time it got a third of the way around it was moving away. It also had gained quite a spin. I'm not space navigator, but I'd say it headed off to the left of the planet and inbound toward the

sun. Pretty soon it was invisible because we were on the wrong side of it to get any light reflection."

After the call ended, Tom put in another call to the Observatory.

"Bob? I have a simple question for you. Where is Dysnomia?"

"I'm sorry. What? Where is Dysnomia? Eris' moon?"

"Exactly. You've see the video we got of the impact from Haley's Comet and how the moon went crashing down into Eris, and I have one report from a crew member that tells me Dysnomia definitely survived the impact and even rolled a little around and then off Eris. So, if it did not perish in the collision, where is it?"

"I'm going to have to call you back on that. We don't have control of Callippus for another three hours. At that time I'll put it to full use on that area."

He called back nearly five hours later, just about the time Tom was ready to call him.

"Okay. Here's what we found. First of all, Eris is no longer in one piece. It is in at least three with possibly a few hundred miles between the farthest of them. But, your question was about the moon. We found it. It would have been easy to mistake it for a very distant galaxy it is now so faint. With no reflection from Eris it is at least two magnitude dimmer that before. But, it is there."

"Where?" It was a simple question and Bob's answer was equally a simple.

"Sixty-three thousand miles closer to us and spinning like a top. But, holding steady. When you go back out there you will easily find it."

"Okay, but what the heck to do I with a disenfranchised moon?" Tom asked.

It was a very good question indeed. The silence on the other end of the line told him that his friend and astronomer had no answer for it.

CHAPTER 15 /

THE *DART* BREAKS THE LIGHT BARRIER

THE *TranSpace Dart* sat on the takeoff pad at Fearing, poised with its nose in the air and its fins nearly resting on the ground. Only the small nubs of the special spacers that kept the repelatron dish from touching the ground held them off, and then by only about nine inches.

While Tom had been planning for their return trip, technicians had climbed all over the tail fins affixing mounting brackets, one pair per side, for a total of sixteen. Now, hugging the fins tightly were eight mules.

Each one had been rebuilt with only minimal repelatron emitters but with four Attractatrons and a higher capacity power pod inside their now bulbous main bodies. Tom hoped this new configuration would let him direct the mules into positions where they could capture individual pieces of the planet and draw them closer together.

After that—he had no idea what he might do to rebuild the planet that seemed to be determined to break apart. New measurements taken from Callippus showed that the planet had now broken apart and was scattered over an area nearly five times the original planet's diameter.

By the time they would arrive it would be nearly ten times as wide a field of debris.

Doc had to beg off the second trip out so Tom made a phone call.

"Jon? It's Tom Swift. So, you have the earlier trip into space already. What would you say to a second trip. And, before you answer that, I need to tell you this one is going to be longer, perhaps up to a month." He went on to describe why the trip was necessary and the basic responsibilities.

"Gee, Tom. You think I can handle some copilot responsibilities? I'm flattered, of course, but I have to ask if I'm that 'scrape the bottom of the barrel' person for the crew?"

Tom laughed. "Hardly. When we let you play with *Goliath's* controls you took to those like a champ. The new ship if a lot like that but with a greater degree of computer assist." He mentioned the black hole power source.

Jon whistled in appreciation and surprise at hearing what would be sitting a hundred feet or so in front of their noses.

“So, I don’t need an answer today, but—”

“Of course I’ll go!” Jon declared. “Only an idiot would say no, and I’m only occasionally an idiot. Not today. Tell me when and where and I’ll be there. I just need one full business day to get things set at the store for my being away.”

Tom suggested that he come to Enterprises in two days and to be prepared to leave the day following that.

It was no secret any longer what was happening out there, and so Bashalli asked him about his plans at dinner two nights before the scheduled takeoff.

“What can you do about it, Tom? And, if you can do nothing, how long before there is a possibility of troubles here?”

Tom hugged her and little Bart looked curiously at his father and mother, then burped loudly to celebrate the occasion.

“I suppose there are a couple things we might try, but if push comes to shove we might just need to leave the black hole out there and try to form the planet around it. It has never been done, and if it were any larger I'd say it was a foolish idea, but in this case it is small enough that I believe it may be possible to stop up the mouth of the thing with chunk too large for it to ever swallow. Even if it did begin to consume the planet pieces, what about it? If Eris disappears in a black hole, and assuming the hole doesn't grow from that, what is the harm? Nothing for us. But, to your question about when? A century plus several decades now we have real data. You and I will be long gone and Bart will be as well. Even his children might be dead by then”

Bashalli was decidedly not looking happy.

“What?” he asked her.

“You will not leave that black hole out there, Thomas Swift. If you did that, how would you ever get home? I am not losing you just so that stupid planet can be reconstructed!”

He wanted to laugh but knew that would not help at the moment, so he softly explained, “If we get the planet back together, then we can use it to shove against. It will still take about two months to get home, but we will get home!”

She shook her head. “Tom,” she said lovingly, “I have never tried to tell you not to do something, but I will not live without you here for several months. Neither will Bart. So, if that is your

plan, then I forbid you to go. I am sorry, but there is only so much of this I can take." She broke down crying and rushed from the room.

Tom picked their son up and followed her, stopping long enough to put Bart in his crib in the room next to their bedroom.

He found her, face buried in her pillow, sobbing. Sitting beside her he placed one hand on her back.

"Bash. There is a surefire way for us to stay together, no matter what happens out there."

Her crying stopped and she pushed herself up into a sitting position. After wiping her tears with the back of her hand, she asked, "What? How?"

"Come with me. We'll either be gone a few weeks or a couple months, but the three of us will be together."

She tried to smile but shook her head. "No. I take back my forbid... forbiddment... uh forbidding? I could not raise our son in space and I must trust that you will find a way to come home quickly. Besides, how would you take along enough food and water?"

Tom looked slightly embarrassed. "Well, water is not issue because we recycle it anyway—" he stopped at seeing the look of horror on her face as she realized what this meant. "But, you are right about the food. So, we won't leave the black hole out there. I promise."

When takeoff time arrived, Tom's father had some news to share as the group to see the crew off was exiting the *Sky Queen*.

"Jake Aturian and I decided to push the production of some additional Attractatron mules for you to take along. Now, before you tell me you have no room, I want you to remember that your old man used to be a wiz at mathematics and can even operate one of those new-fangled computer things, so I ran the numbers. As near as I can tell, by having the mules use their Attractatrons to grab onto the *Dart*, standing off by a few dozen yards, they can easily be dragged along with the ship and will remain within the gravitational field set up by the black hole!"

Tom looked amazed, and he was.

"I— I don't know what to say, Dad, other than thank you! It was in the back of my mind that eight aren't enough, and even if we can restart the two we left out there... well..." He paused. "How many?"

“Twenty.”

The younger man's mouth dropped open. “If Bud were out here he'd say, 'Jetz!' so assume I'm saying that now. Where are they?” He looked around the field at Fearing and could see no sign of them.

Damon Swift pointed straight up. “In orbit near the old Outpost. You'll need to make a slight detour to get them, but they are pre-programmed to latch on and just follow.”

The *Dart* lifted off an hour later after a tearful goodbye between Tom and Bashalli, and an equally emotional one with Bud and Sandy.

Without incident, the new mules hooked themselves invisibly to the ship and with only a two hour delay they headed outbound.

“Tom?” Bud had a worried look on his face.

“Huh? What is it, Bud?”

The two sat in the control seats at the nose of the *Dart*. They had taken over for Hank and Red two hours ago as the ship neared the orbit or Mars and had connected with the black hole. Since then they had passed the time mostly in silence.

“Can I ask you a, well, a personal question?”

Tom chuckled. “Flyboy, after all these years you can ask just about anything. So, shoot.”

The flyer took a moment to collect his thoughts before continuing. “Okay. I need to ask you if I’ve really messed up. See, Sandy and I had a discussion just before we left and she told me I’ve been insulting your wife for a number of years.”

Now it was Tom’s turn to look worried. She had mentioned nothing to him. Had she and his sister been talking and she’d said something was bothering her? “Ummm, give me a bit more info, Bud. What did Sandy say?”

Bud’s face turned red. “I… I guess I’ve been calling her the wrong thing all these years. Sandy says that it’s okay for *you* to call her Bash, but I can’t. She says that’s sort of an intimate name that only you can use.”

Now, Tom laughed. He totally understood the issue.

“Okay. Here’s the thing, Bud. Girls are given an official name at birth. Let’s call that her long name for now. In our world it is Bashalli. There is also a diminutive version of it. In my wife’s

case that is Bashi. All her friends as she was growing up called her Bashi. Even Moshan, her brother, called her that, so did her father. Her mother still does because as the girl passes into womanhood, and I think that's when she turns fifteen and all the adults and men in her life start to try to find a marriage partner for her, only very good friends and family still call her Bashi. It becomes a term of endearment at that point. So, Sandy calls her Bashi as does my mom.

"Moshan and her father, out of respect for their traditions and for her reverted to the longer Bashalli. In fact, that is how Sandy introduced her to us if you'll recall."

Bud nodded.

"Fine. So, after a while she told me, told you as well I think, we could call her Bashi."

Bud's face brightened. "Oh, yeah. I remember that day."

Tom grinned at him. "Then, weeks later once she and I had our first kiss she told me she would like me to call her Bash because it is the more intimate version of her name. You sort of picked up on that and switched as well."

Bud slapped his forehead. "So, I've been calling your girlfriend and now wife by her lovey-dovey name?"

"Yep!"

"Oh, man. I feel like an idiot. Why didn't anybody tell me?"

Tom patted his friend on the forearm. "I asked her back then and she smiled and told me that as long as I was your best friend that gave you special dispensation. Not officially, and her father discussed it with Bash several times, but she figures there is a special place in my heart for you and so their should be one in hers. No harm, no foul, and you do not have to change."

Zimby poked he head up between their seats. "You guys in deep discussion, or can I interrupt to offer you a steaming sippy cup of coffee?"

Both answered at the same time with, "Yes," and "Absolutely."

The other pilot looked at them both, shook his head and muttered to himself as he slipped back down the short ladder to the living spaces deck.

"Uh, Tom? How do I handle this with Sandy?"

"You look her straight in the eye, tell her that the man of the house told you it's okay, and then tell her to fix your dinner and fetch you slippers." Tom could not keep a straight face for more

than a split second. Once he managed to stop laughing, he simply said, “I’ll get Bash to set it right.”

Three minutes later it was Jon Wolff who poked his head up into the control cockpit. “Gentlemen? Zimby asked me to bring you these as he has just received a rather urgent call from his young daughter, CeCe. I guess when you are four talking to daddy becomes a very serious matter indeed.” He smiled as he handed over the two sealed mugs.

“Is it serious?” Bud inquired.

Jon shook his head. “As far as I could overhear before she made him promise to put the call on ‘secret silencer mode,’ as she is having boy troubles. It would appear a young man, unnamed, at her pre-school told her he loves her and wants her to marry him. I think she is asking her daddy either for permission to marry or punch the boy.”

Tom thanked their friend and asked how he was holding up to the flight.

“All things considered, better than I even hoped. If you will recall I had no issues with our hop up to the space station to get the telescope so I was thinking this would be like that, only longer and possibly a bit boring. But, I am anything but bored. Red had me make a couple tiny course corrections and Hank had me computing some of our later maneuvers.” He stopped, looking at Tom. “It is okay that I do some stuff, isn’t it? I don’t want to have anyone think I am just along for the ride.”

Tom snorted with good humor. “Jon? If it hadn’t been for your idea of harnessing a shooting star, or whatever it was you said, my brain probably would not have considered our black hole locomotive. You are here as a legitimate crew member so you can absolutely take the controls, under supervision, of course.”

“Tom never leaves *me* alone with the little stick and all the buttons,” Bud said, sounding like a petulant small child. “He’s a meanie and no mistake. And, I think he likes you best of all of us!”

“Pay no attention to the bewildering space child that is Bud Barclay, Jon. He has gone space happy and I’ll probably need to give him a time out sitting out on the hull to contemplate his sins.”

“Can I ask something in some sort of seriousness?”

“Sure, Jon. Shoot.”

“Okay. I know we want to get out there as quickly as possible, and we also want to do it as safely as possible, so when do you think we are going to open this puppy up and accelerate out of this idle mode?”

“Ever the Speed Racer, huh?” Bud asked.

“He has a good point,” Tom admitted. “So, gentlemen, after about one more hour of testing, I think we shall take Jon’s suggestion and give this thing some gas. Jon? Tell the others that I’ll make the announcement about strapping in, in, about fifty or sixty minutes. And, thanks for the coffee!”

As he took a sip of the hot beverage Tom checked their speed. The black hole arrangement had them accelerating at the equivalent of 2-Gs and yet they felt as if they were standing still.

About a half hour later Tom was satisfied with everything in and outside the ship. “Bud. Let's try a little experiment, shall we?”

“Okay. I'm game, but I have to ask you what that is going to be.”

Tom chuckled. “Don't want it to be a surprise?”

The flyer shook his head. “Not if you expect me to help and not get in your way.”

Tom explained that he wanted to add some extra propulsion by using their repelatrons to shove them harder against the black hole.

“The Attractatron is strong enough to overcome that and keep us at the proper distance,” he explained.

After announcing to the other men in the crew to strap in, just in case of any unforeseen issues, he slowly brought the power up in their main drive. As he did, he simultaneously was inching up the power setting in the Attractatron. It took some careful balancing, but within ten minutes, and his face now bathed in sweat, he sat back and pointed at their speed indicator.

Bud gasped.

1.02 times the speed of light!

“How's that even possible, Tom?” he gasped again.

“I don't really know, Bud, and I don't plan to try to figure it out, at least not right now. All I want to do is to monitor things to make certain we aren't getting ourselves into trouble. But, a guess would have to include gravity or time distortion caused by our black hole.” He called back over his shoulder. “Anyone back

there feel anything different?"

There was a chorus of negatives from everyone.

As the two in the control seats watched, the ship sped past the asteroids, they slightly blurred. Then, all too soon Tom realized they were approaching the orbit of Jupiter. As he swung the telescopic cameras to their left and trained them on the distant planet, it, too, was a soft blur.

"I guess once you get up to this speed either everything else goes into soft focus," Bud commented, "or my eyes are."

Thirty minutes later they were crossing Saturn's path and another thirty minutes and Tom decided to drop their speed. He needed to have the entire ship checked to ensure they were not doing some untold damage to anything. As they dropped down and he turned off the repelatron drive, they slowed quickly to about 78% the speed of light and remained there. Forty-one minutes later they passed where Uranus would be if it were not two-thirds of the way around the sun.

There were no reports of damage and even the tag-along mules were still invisibly clinging to the ship. All seemed impossibly right at the moment. They continued racing along at 78% light speed even with no additional propulsion.

"I think that answers the question about how fast we can travel using just the black hole," Tom said. "And, I did a little computing. I figure that if we just allowed the hole to keep speeding us up, it would have required three days to get up to the speed we did. That, by itself, is amazing. But, now we know we can push things along I see no reason why we have to satisfy ourselves with slow, long-distance travel from now on!"

It required an additional five hours to reach the nominal orbital path of Pluto and this was where Tom maneuvered the ship around so the black hole pointed back toward the sun. The effect was immediate.

The ship and its flotilla of small craft began to slow down. For the next three hours they continued to slow until Tom realized they would not get out to Eris unless they spun back around and added a small amount of speed.

He and Bud brought them back into position but they backed away from the hole by one hundred feet. At that distance their speed was about a quarter of what it had been and would allow them to reach Eris in another six hours.

Tom and Bud took a break and Hank and Jon took over their positions.

The ship was still an hour away when Hank called back.

“Is the skipper asleep?”

“No, Hank. I'm here,” the inventor called out. “I had a little nap. You need me?”

“Well, I think we found out what happened to Dysnomia after the collision.”

Tom was up the ladder with his upper body between the two seats in a flash. “Where?”

Hank pointed off to their left. “About thirty degrees off the bow and maybe fifteen down. See it?”

Tom did.

Dented and rotating in a way it had not before, was the small moon that had done so much damage to its parent planet.

“It appears to have stabilized back in the relative orbit from before and is keeping its distance from the parts that were once Eris.”

Tom swung his gaze forward and could see, dully illuminated, several dozen chunks that now looked more like a cluster of asteroids than parts of a former planet.

“Are they holding orbit?” he asked.

Jon spoke up. “If I'm interpreting this right, the answer is no. They are not exactly zooming into the main part of the solar system, but they are drifting slightly in that direction.”

Tom nodded. “That makes sense. Smaller pieces won't have the mass necessary to stay in a stable orbit out at this distance. Guess we have our work cut out for us, huh?”

The two in the seats agreed.

After taking the microphone, Tom announced that the first order of business was to take a detailed inventory of all the pieces of the former planet Eris and to plot their individual trajectories. “We will concentrate on pieces that are at least a half kilometer wide or deep,” he told the crew. “My hope is to shepherd the biggest pieces back together and sort of reassemble the jigsaw puzzle that is or was Eris.”

Bud leaned over to him. “That's a pretty big job, skipper. Are we going to try to put them back together like they ought to fit or just slam pieces together and hope they stick?”

Tom had to give that some thought before answering.

“Ideally, we really do reassemble or reconstruct the planet.

The problem I'm seeing right now is deciding where to start. The core broke up as soon as it cooled to the point where it could be shattered by other chunks bumping around, so we don't exactly have anything to build around."

He thought about one other thing and mentally slapped his forehead when he realized one distressing truth.

"We never made this ship... *I* never designed this ship, to be really maneuverable. Ditto, I didn't think about bringing our something you and I could zoom around in to see what is what with each major piece. I thought about adding ion drive but never followed through. Rats!"

"So, what do we do?"

"I might have a suggestion, but I warn you it is coming from complete ignorance about how things work in space and a vacuum."

The two men turned to look at Jon. "Go ahead," Tom urged.

"Okay. What about sending out those mules of yours but keeping them attached to each other. Then, they grab hold of a target piece and once they all have one, they pull themselves in closer. Sort of back into each other. Dumb idea?"

Tom shook his head. "No, in fact it might be the most brilliant idea around. Let's get going on it *right now*!"

CHAPTER 16 /

A NEAR CALAMITY

IT WOULD take two full days to reconfigure the mules using all the spare Attractatron emitters carried onboard to replace one of their repelatrons. Even with that Tom knew he needed to go for a spacewalk to remove the units from the two stricken mules. With those they would be able to create only eighteen usable vehicles.

Duanne would be in charge of that work along with Hank and their cargo man, Peter. And, as Tom had anticipated, his special electronic skills were going to be a key point in the success of that work.

While that was beginning, Tom spent most of his waking hours programming the changes into the basic mule functionality to allow them to grasp multiple objects and to use a balanced routine to pull in on one side for a specific period of time, then switch to pulling on the other. In that way no Attractatron would be overly taxed and, Tom hoped, none of them would suffer overheating.

With one of the two "dead" mules from the initial trip out now floating close to the ship, and partially stripped, Tom came to the conclusion it would have to be written off; there was very little chance of it being brought back as they now had no way to stick the empty shell to the ship's hull, and could not be outfitted with a repelatron and Attractatron to let it tag along when they went home.

That left the other unit they could probably salvage, but it had drifted farther off. It wasn't within visual contact, but a good sweep of the entire area for any electronic signals finally located it. Unlike mule number one, that had drifted nearly straight out and back toward the core of the solar system, for some reason mule number two had drifted backward against the orbit path of the planet. It currently sat more than a million miles away, drifting at a rate of about a mile a minute farther and farther into the distance.

"Are you up for a rescue mission?" Tom asked Bud.

"You bet, but who or what?" he asked, concerned.

"Our little missing mule." Tom explained where it was to be found and described his idea for rescuing it.

"Before Duanne and the others change over all the units we

brought with us, I believe you and I can take two of them out and sort of tag team the rescue."

"Okay," Bud replied cautiously, "but why not just aim a beam at it and pull it in?"

Tom ticked off three items on his fingers.

"Too far, too small, and too much tomasite. While it certainly isn't impossible to latch onto tomasite, because of all its properties you have to be pretty close. Maybe twenty thousand miles away and not a million."

After announcing to the rest of the crew their intention, Tom had a private word with Red Jones giving him instructions on what to do in case of an emergency.

Next, the two young men suited up and grabbed special harnesses that could be attached to the hulls of the mules. If not for those there would be no way to "ride" them out and back. As it was, only by using arm-mounted remote controls would it be possible to maneuver them at all.

"Since when did you think to bring those remotes?" Bud asked as they stepped into the elevator that would take them aft. It also served out here in the vacuum of space as an airlock for the ship.

"I didn't," Tom admitted. "Dad did. He sent two of them in case we had to do some muscle-powered work out there. We have maneuvering backpacks for a few suits but he told me there might be a need to personally control a few mules from nearby. So..."

"So, another Swift foretelling of a future need! Consider me convinced of the infallibility of your combined brains!"

Outside they activated two of the waiting mules that were still attached to the nearest fin.

"What's the program?" Bud asked. "I mean, sure we can shove against the ship to get out there, but what about how we maneuver around and better still, how do we get back?"

"Back? We use the Attracta—" and Tom stopped. "Oh. Same issue about the tomasite, huh?" He thought a moment and then raised one gloved hand. "Got it! We do what I said before, We tag-team this. We move out together until we barely have any attachment to the ship, or better yet the closest piece of the planet, then I move on out until I can barely keep Attractatron contact with you and your mule, and we hope like heck that gets me near enough to grab onto that disabled mule."

“I love each and every part of that plan, skipper, except for the part where it is you that moves farther out. Your dad will skin me alive once we get back if he finds out I let you take that risk. So, as we have discussed before, you may be senior honcho here but I am the test pilot and the one paid to take these risks. No arguments!”

Tom wanted to argue the point or to overrule his friend, but Bud had spoken the truth once again. Not only that but his own father had spoken with him the morning of takeoff telling him that if it came to any dangerous situation, the flyer was in the right to insist he take that chance in order to keep Tom safe.

The final straw had come when Damon reminded Tom that he had a baby son now, and his level of personal responsibility back home had gone up exponentially.

“Fine. I don't like it but dad is the senior man out here, not me. I do insist we take it slow and easy.”

They did. In fact what might have required only four or five hours took that five just to get them far enough out for Tom to get locks on the *Dart* and the planet, and for Bud to begin moving farther away.

Tom's Attractatron not only locked onto their return point, it provided the anchor point for Bud's mule to use its repelatrons against to shove itself farther out. Once it got up the appropriate speed he switched himself and the ship around to where he could use one of the Attractatrons to find and hold onto Tom's mule, loosely, and then he began the task of probing ahead to where the missing mule would be by now to try to get a lock on it.

Three hours passed. Then four, and then five.

“Skipper?”

“Yes, Bud. How is it going? Anything yet?”

“Well, that's a yes and no sort of question. Yes, I can find the mule with the Attractatron, but no, no lock on so far. I think it might have rotated so it is edge-on to me giving less to grab. I'm hoping it is slowly rotating a bit to offer more area. I called because I seem to be losing the fight against boredom. My eyes want to close, but my brain isn't helping me keep them open. What should I do?”

“Hmmm. Well, you can either sing me a song or start telling me stories about you and Sandy and your plans for the future. Like, when you might start your own family.”

“Oh. Yeah. That, huh? Well, promise this won't go father than

between us and whoever might be monitoring us from the ship —"

"We're on a suit-to-suit channel so it's just us, flyboy," Tom reminded him.

"Right," Bud said, his voice sounding a bit more bright. "Okay, well the truth is that Sandy and I *have* been trying. A lot. She's more than a little jealous of how easy it seemed for Bash to get pregnant. Anyway, Doc has privately put us through a few tests and got us in contact with a specialty clinic in Boston. It turns out both of us have issues, and... hey! Wait a sec! I think the mule has turned. I almost have it—"

Several minutes passed before Tom radioed, "How are you doing, Bud? It needs to be pretty quick because I'm showing you are just about to slip out of my lock-on range."

"All I've managed to do is, or I think what I've done is to get it to stop drifting farther away. I can't seem to get a grip on the darned thing. If I could move another five or six thousand miles off, I'm sure I could get that mule under control."

Tom had a small moment of thought. "Bud. I wish there was some way to just get the *Dart* to move us all farther out, but that would take precious maneuvering fuel and time away from the real task. We might just have to give up on that one and call it a loss."

Sounding very disappointed, Bud replied, "Isn't there some way to set the power to over one hundred percent? I mean the mules did that before and... oh. And, they burned out, didn't they. Forget it. Listen. I'm going to move a thousand more miles out. Please tell me you can keep me in your grip."

Tom wanted to chuckle but he knew this wasn't anything humorous. "I only wish now that I had thought of what I just came up with, Bud. If we had brought out something solid for us to both grab onto, like the empty shell of the dead mule, we could station that in between and extend your range. As it is, we're nearly at max separation, but if you can move out slow enough I'll see if I can extend us both a little farther from the ship."

Eleven minutes later they both realized it had been a mistake, and one that might cost them their lives.

"Skipper? Are you still seeing me? I mean, do you still have a hold on my mule?"

"You just broke free. I can still come out and get you, but we're not connected to the *Dart*, Bud. I lost that attachment

about ten seconds before you slipped from my Attractatron grip. I still have you on the detector, though. How are you doing on the dead mule?"

"Well, I have it, barely, and think I can draw it closer but now I'm more concerned about us all getting back. What do we do?"

"You keep working on that end and I'll work on something from my end. Pity the ship can't swing around and grab us. And, if there were more remotes for the mules then we might get one of the pilots, like Zimby, to come part way out, but dad only packed the two..."

* * * * *

In the ship there was little time for concern. Besides, everyone knew that Tom and Bud would radio for help if they required it.

Red checked in with the men performing the electronic work and refitting of the mules. Working in short shifts outside, Duanne and a team of now six others had five of the mules complete. Two others were near completion and the others were standing by.

"It's darned slow work, Red," Hank complained. "Duanne is making it go faster than any of us thought, but doing it all in vacuum is working against us. I think we all need to come in, eat and rest, and then go back out in about six hours. What do you think?"

Red pondered the situation. Personally he might have called for food and rest a couple hours ago, but everyone involved seemed so eager to get on with the work.

"Yeah. Call 'em all in and get some hot food in our people. I'm the only one who hasn't been out so I'll do the suit cycling and you all can climb into clean and fresh-smelling suits when you go back to it."

That work would include a thorough wipe down inside with special cloths to remove any sweat and bacteria. The air recycling system would be refreshed with more oxygen and a new CO_2 scrubbing canister to give them at least another thirty hours of use. Finally, all seams would be stress checked for any weakness and repaired if needed.

He allowed Zimby to spell him at the controls for a couple hours while he joined the other men in eating, then came back to the cockpit where he took the copilot's seat and settled in for a nap.

* * * * *

It took a couple hours but Bud reported success.

“I've got a good hold on the thing, but as soon as I try to bring it closer, it pulls me farther out. That old Third Law thing. So, I've stopped for now. Did anything come to you?”

Now, Tom did laugh. “Not until just now, flyboy, but I think I have the answer and it included our old friend, Newton. Here's what I'm going to do. I still have repelatron contact with the ship so I'm going to shove my way out toward you a little. As soon as I'm able to grab you I'll give the word and I want you to focus your backward-facing Attractatron on me. On my mark we both pull.”

“Uh, skipper? I hate to rain on your idea, but won't that just yank you our here?”

“A bit, but it will get you and your cargo coming in. If possible keep dragging that other mule closer to you, but don't sacrifice too much momentum coming in this way. We are going to play alternating slingshots. You come in and periodically I pull you a bit more until you have sufficient speed to pass me, then, as you get farther away, but closer to the ship, we reverse things and you give my mule a yank. It'll slow you and your two mules a bit, but with greater mass that my one mule, eventually we'll all be heading back in.”

He took the time to call the ship to tell them what had happened. Zimby answered sounding like he was about to panic. “What can we do, Tom?”

“Really? Nothing, Zim. Just don't let the ship go away from us. In about twenty hours we'll need to grab onto you to pull us in. Until then, expect that Bud and I will be doing a bit of sleeping. We're both exhausted, it will extend our air supplies, and for at least the next nine hours plus we are going to by drifting closer to each other with nothing else to do. Can you arrange to give us a wake-up radio call in seven hours?”

“You bet! Any particular voice or would you prefer music?”

Bud, who must have noticed Tom was no longer on the suit channel, had switched his radio to the longer-range setting. “I'd really prefer the dulcet tones of some beautiful blonde back in Shopton, but we probably will need the *1812 Overture*, especially the cannon part.”

Once they switched back to suit-to-suit communications, Bud asked Tom what they needed to do.

“Nothing, Bud. My instruments show you and your trailer coming back this way, slowly but surely. We won't be in position

to pass until nine hours from now, so get some sleep if you can. It'll help conserve our CO2 scrubbers. We're going to be cutting it pretty close as it is."

Actually, Tom thought, *we are going to be a couple hours in deficit by the time we get back*. He now was worried that Bud could do the same math and conclude the same thing, but knew his friend would never say it out loud.

Sleep came, although fitful, to both of them and was sorely needed. When the sounds of the wake-up call came—someone onboard had a music file of a Beethoven sonata that was fairly loud and jarring—both of them were on the verge of waking up on their own.

Tom radioed his thanks and then took a sip from the tube in his helmet that dispensed a liquid that was both thirst-quenching as well as containing sugars and nutrients.

Eighty-six minutes and a few seconds later Bud and his mule passed within nine hundred feet to Tom, and thirty-six minutes, thirty seconds after that the other mule passed slightly closer.

Now, Tom and Bud began a coordinated approach to the problem. Tom set his repelatrons to give Bud's craft a good shove while the flyer waited ten additional seconds before he turned up the power on his Attractatron to get a good grip on Tom.

Both young men thought how nice it was to have the harnesses to hold them onto their mules, but both regretted the level of inertial jerking that came with each maneuver.

But, it was working. In fact it worked so well that nearly three hours ahead of the time Tom anticipated they would be able to each grab onto the *TranSpace Dart*, they had lock on. Someone else had a lock on them as well so they were coming in at a good pace.

Again, exhausted and now out of the liquid food, their carbon dioxide levels beginning to rise, they brought their trio of mules to a halt within yards of the ship.

The six men outside finishing the work on the other mules rushed over to detach them and get them into the ship.

As Tom and Bud sat, more slumped, in a couple of the acceleration couches on the lowest level and food was brought to them, they grinned at each other.

"Another last minute clutch score for Team Swift, huh?" Bud said as he took his first forkful of solid food in more that a day and a half.

Tom sighed. “Did you ever get the feeling we have just about gotten too old for this stuff, flyboy?”

The flyer raised an imaginary glass and jiggled it a little. “Here, here! I'll miss it until the next time we do this sort of thing and come to the same conclusion. Again.”

By the time they reached their bunks they were nearly asleep, and both stayed that way for over eleven hours.

They each woke to a smiling face. Tom to seeing Hank bending over him and Bud with Red's somewhat weather-beaten face near his.

“Rise and shine. It's a beautiful day and we have a nearly full compliment of mules with which to start our little project.'

Hank added to Tom, “We have cannibalized the dead mule and used some parts to get the one you and the flyboy dragged back up and ninety percent operational. It's going to need to be a repelatron-only version so it can shove things around, but it flies and can follow directions.”

Tom propped himself up on his elbows. “Well, without a lot of stuff to push against it might not have a lot of work in its future, but thanks for the update. Give me ten minutes to get cleaned up and changed into something a little less, uhh,” he sniffed at his body suit, “stinky, and I'll meet you and the rest of the crew downstairs.”

“Not me, Tom,” the big Engineer stated. “I'm a half hour overdue to relieve Zimby upstairs. But, link me in by intercom if you are going to be passing out words of wisdom.”

The inventor promised to do so.

He was just leaving his little room when Bud came out from his own. “Good morning, skipper,” he greeted his friend. “Nice sleep?”

Tom nodded.

“Yeah, mine as well. Dreamed of Sandy all night long except for the parts where I was drifting farther and farther out into the void and there was nothing anyone could do for me!” He grimaced. “In other words I had a bit of a nightmare.”

As they headed down the ladder to the lowest level, Tom admitted, “I slept pretty well. Sorry about your dream... the bad one.”

Jokingly, Bud asked as they both reached the deck, “Which one would that be? The one with your sister practically yelling at me that I was never to go into space ever again or the more

relaxing one where I was all alone?”

They made their food selections, waited for them to heat up, and sat at one of the few tables between the couches. A couple of the other crew members were there looking both tired as well as satisfied with the work they had finished.

“How long do you want to hold off so everyone can get some rest?” Red asked as he joined them.

Leaning in and lowering his voice, Tom asked, “How long does everybody need? It can't go on forever because the planet chunks continue to scatter, but I want an alert and ready-to-go crew.”

Red nodded and appeared to be chewing something, but he had no food. “Give 'em four hours. Most everybody had a good sleep break while you two were in dreamland, but a couple are just coming in from the last of the work. Duanne's particularly zombied right now.”

Tom made a decision. He used his TeleVoc pin to contact Hank in the cockpit, who connected him into the ship's announcement system.

“This is Tom. It seems that while Bud and I were playing amongst the stars out there that you lot were doing all the work. So, I'm calling for everybody, and that includes you as well, Hank, to hit their bunks. Read, sleep or play solitaire, but everyone is ordered to get six hours starting now. Hank, I'll be up in three minutes to relieve you. That's it!”

He disconnected from the audio system and turned to Bud. “Want to join me up in the cockpit to play a little game of what do we do next?”

His friend's wide grin told him it would be the two of them there pretty soon. Both finished what they were eating and shoved the containers and plasticware into the recycling slots. Within five minutes those would be cleaned, melted down, and on their way to being reformed into another pair of containers and some forks and knives.

After relieving Hank they slipped into their seats.

“Do you have any solid ideas what to do, Tom?”

He shrugged. “Nope. But, let's keep that between you and me for now. And Dad. I think I need to talk to him right away!”

CHAPTER 17 /

HOW DO YOU RECONSTRUCT A PLANET?

MR. SWIFT had to defer his son's question for more than three hours. "I'll get back to you, Tom, but this is beyond me. I've had a call in to MIT and should hear back from one of their best planetary physics experts within the hour."

He explained that the process had needed to wait for the President to give his approval and to have the FBI clear the Professor in question to be given the top secret information.

The young inventor began sending a stream of data back to Enterprises with as much survey of the various pieces of the former Eris as possible, rate of travel from each other, and spectra-analysis of large sections of each chunk with a breakdown of the physical makeup of the planet.

Something that worried at Tom's sense of what should be and not be part of the planet had to do with the appearance of a large amount of calcium in the planet's crust.

"It is pretty rare to have that as far as I know," Tom said. "It makes it seem that the planet had more a boney shell than an actual crust around it. Might be the reason it broke apart so easily."

"That's a possibility, Son. I'm also starting to see some of the materials from inside the crust. Not what I would think of for a planet. Or, at least not in these amounts. Alumino-silica crystals rather than silicon, a lower level of metals like iron and magnesium, but much higher percentages of cobalt and tungsten. Lots of cobalt from the small, inner pieces. Well, I hope our supposed expert finds something in all this. I'll be back as soon as possible."

When he did call back it was nearly five hours later.

"Sorry for the delay, but our MIT man, or actually woman, wanted to be here in person to talk to you. I sent Deke Bodack down to get her and they arrived twenty minutes ago. I'll let you two introduce yourselves."

"Hello, Tom? My name is Rebecca Murphy. I hold doctorates in Geology, Astrophysics and Planetary Science. I have never been off this planet so all of my knowledge is book learned, not from practical experience. If I sound like I am shooting ideas out at your with little to back them up, I apologize, but that is a fairly accurate

assessment."

She turned to Damon when the answer did not come back immediately, and he explained that even with incredible radio equipment in use there was going to be a couple minutes between exchanges.

"Hello. Do I call you Doctor?" Tom finally answered. "And don't sorry about guessing. We're all doing a lot of that."

She laughed. It reminded him of Bashalli's laugh and that made him feel an empty pit in his gut. "No. Call me Rebecca. So, I need to ask something. Something vital. Are you *certain* what you sent us is the actual data from this so-called planet? The reason I ask, and I'm trying to put as much into this before we both wait for the delay to catch up, is because that would indicate something revolutionary. No planet in our solar system is known to have that material makeup. It indicates to me that Eris was a wanderer that got caught in our sun's gravity. And, by geological ages, fairly recently."

"I'd come to nearly that same conclusion," Tom replied. "But, mine was pure guesswork rather than explicit knowledge. So, the big questions is, can we put it back together?"

"Without the former molten core to act as a sort of hot glue I'd have to say the outlook is grim, Tom. Eris most probably fractured along already present fault lines. Many non-gas planets are built on plates that float over the molten center. I believe Eris was like the Earth in that respect but with a radically different and brittle construction. So, without a gravity core, a molten core, heavy oceans, or a combination of those three, I have to say this might be what used to be called a mission impossible."

He told her his thoughts about using the flotilla of mules.

"One thought is that before the different pieces drift too far afield we set up the mules—that's what we call out little space tugboats, and dad will tell you more after we get off—with each one taking an electronic grip on another one directly behind it but at a distance of several hundred miles. Then, each mule targets and gets a grip on a chunk of planet. Once we have a large number of them we begin a coordinated process of reeling everything in to be closer. So close, I'm hoping, that we can sort of tease them back into position."

Her response, when it came five minutes later, was not encouraging.

She simply stated, "They won't stick together for long. Just as in what happened after the collision, they will drift apart and you'll

be right back where you started within a week or maybe two. I believe it was the sum of the *whole* planet holding it together."

Before they cut the connection, she promised to try to work out an alternate course of action, but strongly suggested that he go ahead with his attempt as it was the only thing they had at the moment.

"Well," Tom said as he turned to Bud when the radio went silent, "that isn't what I'd hoped. And, it cost us another six hours of time we might have been doing something. I kind of wish dad had not tried to get her involved."

Bud looked at Tom. "You do know he is only trying to help, and being hundreds of millions of miles away isn't aiding matters, right?"

"Sure," the inventor stated trying to sound more positive, but not quite managing it. "So," he said after taking a sharp intake of breath, "let's get moving!"

He called their cargo specialist, Peter Daly, to the cockpit.

"I know you're not one of our pilots, Pete," he explained, "but the rest of us have to concentrate on piloting those mules you've been responsible for keeping tagging along with us on this trip. You did a great job on that, and thanks, but now I need to put you to a different use. How do you feel about sitting in this seat and doing nothing for several hours at a stretch?"

Pete smiled. "Ever since we got out here and parked I've felt like that's about all I do, so I'm getting good at *nothing*."

"Wonderful, then the next time Bud here can't come along on a trip I'll bring you instead. He's Enterprises' resident expert at doing nothing." He looked at Bud who was pretending to see something very interesting under one of his fingernails. "Actually, Pete, we need to have someone keep a lookout on all the instruments and to perform a sensor sweep of the area every fifteen minutes or so. If we can get the fully occupied Mr. Barclay to slide out of his seat and swap places with you, I'll show you what needs to be done."

As the man slid into the copilot seat Tom began arranging the instruments so that the cluster of the most important ones would be directly in front of Pete.

He pointed them out, one by one, explaining what he should be seeing, and then turned to the panel of digital buttons, sliders and other controls sitting between the seats.

"These handle the maneuvering rockets of the ship. Under

practically every circumstance I can foresee you won't want to even touch these, but if we need the ship moved, here's how you accomplish that."

The cargo man took to the control set up easily. Tom wasn't surprised as he had been operating a control panel controlling all the mules outside remotely; he understood moving objects around in the vacuum of space. This was just on a much larger scale, but had the advantage of a high level of computerization.

When Tom climbed down the ladder after Bud, he was satisfied that Pete could handle just about any situation.

His next move was to gather the rest of the crew in the lowest level to brief them on what they would soon be trying.

"I won't pretend to believe this will go smoothly, guys. Each of us will be handling three mules at a time. Each pair will be kept opposite each other so in your minds you can see how their inter-maneuvering will work. With twenty-eight of them and nine of us that leaves one extra mule that I will also command. I'm not counting the old one. We have at least two very large pieces to corral, so I will use that to lend a hand where needed to give a bit more pulling power.

"Remember we need to run this like an orchestra; you must work in concert with the man next to you who also has a third mule on another pair of chunks."

Tom described the basic idea of the mission. An imaginary fixed point in space approximately where Eris used to sit would be the target location. The mules would arrange themselves around that point, use their rear-facing Attractatrons to grab onto their pair mate and then would move straight out toward two chunks of the former planet. As soon as possible those would be taken under tow and held in place avoiding any further spread of the debris field.

"I want to put our friend back together again in as precise and logical a manner as possible, and that is going to require that once we get the big pieces under our control I'll need to spend some time devising how this planetary jigsaw puzzle should fit together. But, first things first. Let's get busy grabbing as many of the big pieces as we can."

Hank raised a hand. "Skipper? We have fourteen pairs and at last count about three hundred pieces of planet to deal with. A lot of those are from inside the planet, but a lot more are pieces of crust. Do we just ignore the smaller inside pieces in favor of trying to rebuild the outside?"

"Good question, Hank. In fact, too good. Now, you must forgive me if I have to silently curse myself for not remembering that myself." For a moment he looked very cross, but his face soon relaxed. "For now I believe we must grab onto the big pieces. Then, I may have a plan for how to hold things together while we repeat the process to get smaller pieces, and then smaller ones after that."

Red Jones nodded, "So, once we get a bunch of the pieces we sort through them to find the ones that best fit?"

"That's my idea. And, I'll tell you how I think we will be doing this. We have the one spare mule Bud and I recovered. It's been stripped of its Attractatrons for now so we could have a couple spares, but it is functional and is our extra unit. Once we have the big pieces back in proximity I want Duanne and Hank to do more refitting. Each mule currently sports four Attractatrons. If this job we're about to embark on works, we will be using probably just two, the front and back units."

He glanced around to see if anyone was ahead of his thinking. He saw that at least Duanne and Hank suddenly got the idea. Inwardly, it made him smile.

"So, just to put it on the table, I want to try to outfit that extra mule with as many Attractatrons as possible and then use it as the centerpiece to pull things back in and hold them while we go out gathering more."

He knew it was an incomplete plan, but wanted them to get moving on the first stage, so he gave them assignments and let the paired teams have a few moments to discuss tactics.

Just before everyone suited up—he felt it would be best if they were outside the ship and in sight of their targets—he reminded them about the relative strength of the mules versus the mass of the planetary pieces.

"Go slow and steady. Don't be surprised if it takes hours to get your pieces to slow down and stop moving away. If it takes a couple days to do this first set of steps—if it only takes us a *couple* days—I will not be surprised. The one thing we really can't afford is to burn out any more mules."

As he and Bud suited up, the flyer asked, "Do we have anything to keep all these parts together once we get them collected? Other than the extra mule?"

Tom shook his head. "No. Now I'm wishing we had gone ahead with preparations to create an asteroidal launch surface. Remember? I had thought to shove a bunch of pieces together and

then drill anchors into them, connect them with cables and winch the thing together in a tight enough bunch to give the repelatrons something to get a good shove against?"

"I sure do. But, other than a bit of push on the comet if we didn't have this little adventure, how would that had helped?"

"Well, I stopped that project too soon or else we would have had a dozen or more fifty-mile cables and the winches. Those never got built."

Bud's face lit up. "Oh, I see. We might have stashed those on the *Dart* and just happened to have them now, right?"

Yes. But, we don't, so Attractatron power will need to do the trick. Only…"

Bud's face became concerned. "Only, what?"

"Well, only that's only going to last so long. Then there's the fact we will need to abandon some or all the mules out here and those do not come cheap. Dad will be philosophic about the costs, but we're looking at a couple million dollars apiece. And, Uncle Sam hasn't offered to pay for them."

"Pretty cheap price to pay to save mankind, don't you think?"

With a rueful chuckle, Tom replied, "There you go, sounding just like my father. But, thanks, flyboy. You are right."

Over the next several hours as the different teams jockeyed their mules into positions, and specific pieces of Eris were targeted by all, Tom and Bud talked about a number of different things, but one of them the flyer wanted to know more about was the inventor's giant wheel. It had disappeared the day after he had driven it.

"That? Well, I had the gasoline engine removed and a high-torque battery powered electric motor installed along with a battery pack and a ring of small solar panels around the perimeter. It headed up to the Mars colony a few weeks back where Haz Samson has been testing it out. Preliminary results came in just before we took off but it looks like it may solve one of their long-distance excursion issues."

"Neat! I can hardly wait to go up and take it for a spin in the Martian dust."

"Yeah, but let's get this planet reconstruction project going before we plan that trip. Okay?"

Bud looked embarrassed and agreed they had other priorities at the moment.

Finally, the time came when each man reported their mules were in position. Tom made a check and determined that Hank was actually in most need of the additional mule, and he insisted he could easily handle it himself.

"Makes sense, don't you think, skipper, that I know more about what that mule ought to be doing?"

"You're right, Hank. I only wanted to be in position to help if needed. She's on channel fifty-three, so take her when you are ready."

One of the great things Duanne had been able to do was to build seven more multi-channel remote controllers from spare parts in the ship's stores. Now, each man outside had an arm-mounted controller capable of managing the maneuvers of as many as six mules at one time.

When he has been shown them, Tom told his electronics man to remind him about both a raise and a bonus when they got home.

"Everyone? We don't have to start on the exact same beat, but we do have to coordinate positions. Especially so once we get things headed back in. So, stay alert. If anyone feels weary let me know. It is possible you can lock your mules into stable positions and head inside for a short break. As it is, there's no way this can get done in less than about twenty hours, so we will all be taking at least three rest periods. Any time you are ready, go ahead and energize your mules."

For Tom, the four pieces he needed to concentrate on were among the smallest ones, assigned to himself when he thought he would be controlling the lone extra mule. But, it made sense to keep that four which would give him more time to supervise and check on how everyone else we getting on.

His four pieces, being small, had travelled farther than most. Without a good map of what had been positioned where, all he could think when looking at them on the long-range camera feeds from his mules was they didn't have any smooth surfaces, so they must have come from beneath the crust.

As he got hold of the first piece he took time to pair that mule with the one heading out the opposite direction. Once locked together the second mule slowed but continued outbound. Twenty-three minutes later he had that piece under control and locked the two mules into a holding pattern. The next pair of pieces were captured in under fifteen additional minutes working with Bud's third unit.

With his chunks under control Tom took the time to flit around in space to check on the status of the others.

Hank had beaten him to getting his pieces in tow, even the largest one that had two mules attached. Bud was just getting his second pair positioned as was Zimby. Red said to give him five more minutes and Jon Wolff was half a minute behind him.

The others were each within fifteen minutes of having their pieces in the grips of their mules.

When the final pair was captured Tom called a brief rest break. He could see beads of sweat inside every man's helmet. It wasn't the physical strain sort, but the deep concentration kind.

Over five, boring hours the team had worked to slow then stop the outward motion of their pieces. When the last man reported success, Tom told them to set their mules into **MAINTAIN** mode and they all went inside for rest break number one.

Each man cleaned out their suits before placing them into the drying racks that blew warm, dehumidified air into all parts to get out all moisture. The next thing was food and liquids. After eating nobody seemed ready to get up from their couches with several already sleeping.

Tom gave into that and was asleep in minutes.

Pete beeped them at the four hour mark, the agreed on time. As the men lined up for the shared bathroom Tom popped up into the cockpit.

"How are you holding out, Pete?" he inquired.

The man looked a little tired but he smiled at his boss. "I have nearly exhausted the possibilities of the three games I brought up on my tablet computer, skipper. But, if you can spell me a bit later, I can handle another five or six hour shift."

Tom looked closely at him and knew Pete could not remain awake and alert for that period.

"No, I'm here to spell you now, Pete. You head below. I'm able to control my mules from inside and can do that while I manage the controls up here. I'll call you in six hours or so."

The other man got up and with a grateful grin headed for his little cabin.

The entire next shift outside saw each of the pieces being pulled inward. Of course the small pieces came in with relative ease. Hank and Red had the largest pieces and therefore made the least amount of headway, but by the time the next rest cycle came their individual mules were able to reduce power output and still

maintain some movement of the pieces back into the hoped for position.

It went like that for another sixteen hours, a little longer than Tom had anticipated, and by the end the men were exhausted but all the pieces were within five thousand miles of each other.

Tom made a report to his father forgetting to check the clock, It was currently four in the morning back home, but Mr. Swift did not complain about being roused from his sleep.

"That is good news, Son," he complimented Tom. "Tell the crew they have my appreciation for the hard work. I suggest you all get some rest before trying to redo that puzzle."

Tom agreed and told the men to take a full eight hours.

When they all got back outside, now refreshed physically but still mentally beat, Tom began giving orders for the assembly. Small pieces like his own where maneuvered in first with their mules slipping out to take a position close to the ship. Next came some larger pieces and finally pieces that could only have been some of the crust. In all he believed they had captured about ninety percent of the former planet. It had not, after all, turned to dust, just many chunks.

As the final pieces were moved into position, using the rest of the planet as the anchor points and giving final gentle tugs to the chunks before moving mules out, Tom slipped inside the *Dart* so he could use the instruments in the cockpit.

The mules were all placed into their stations around the ship and the men came inside and cleaned up.

But, as they sat in the lower level congratulating themselves, Tom came down the ladder. He did not look happy.

"I don't know how to tell you this, but the pieces have begun to move away from each other again. And I finally understand *why*!"

CHAPTER 18 /

ABANDON, OR MARSHALL ON?

"WHAT IS IT?" Bud asked in alarm jumping to his feet. It would have looked like a more serious movement had it not been for the fact the artificial gravity in the ship was only three-quarters that of Earth's, and his motion made him float up off the floor two feet and hover in the air a split second before coming back to land.

Suppressing a smile he did not feel, Tom explained. "Simple magnetism. There is not a lot but just enough ferrous metal in that planet to hold a magnetic charge. And as we all learned in grade school science, like poles repel. I don't know if turning everything upside down will help or will reverse the alignment to meet the opposite poles attract situation, but that magnetic repelling force is what moved the pieces of Eris away once it had been fractured."

"As if the planet was just looking for an excuse to break apart?" Jon asked.

"It's beginning to look like that, Jon," Tom told him. "The good news is that the pieces are moving only very slowly right now. We have ample time to get our rest break and give me time to think this over. I'm going to let the folks at home know about this and see in anyone there has an idea. For now, eat and sleep. I'll see you all in eight hours."

He headed back up the ladder with Bud at his heels.

Stopping on the middle deck, Tom looked at his friend. "You get some shuteye as well, flyboy."

Bud grinned. "I'll make due with six hours. For now, where my amigo goes, I goes."

"Okay, then come on," Tom told him as he turned to go to the cockpit.

They relieved Pete and Tom thanked him for his diligence.

Pete shook his head. "Don't thank me, Tom. I let you down. I think I fell asleep for nearly an hour a couple hours back. Sorry."

Tom laughed. "No problem, It isn't as if we're in a high traffic area or anything. Don't bother yourself about it now. Just go get some real sleep with or without food first."

While the man headed down and Bud slid into the copilot's seat, he got ready to radio back to his father with the report of the planet's magnetic personality.

* * * * *

At nearly the same moment when Tom and Bud first stepped outside the *TranSpace Dart* to take the pair of mules out on their retrieval mission, a young woman appeared at the front gate of Enterprises. Within minutes Damon received a phone call from Gary Bradley, the third in command of the Security department.

"Damon. Hi, it's Gary. We have a small brewing situation at the gate. A woman representing herself as a reporter for CNB, Consolidated News Broadcasting, is insisting that she be allowed to interview you. Says she has information that will, and I, quote, 'Blow the lid off the Swifts and how they are manipulating both the free press and the Government.' End quote. I'm on my way out right now but wanted to see what you think about this."

Damon did think for a moment before responding. "Okay. If she seems belligerent or unreasonable, remind her that we are taking direct orders from the President of the United States. And, those orders are to give exactly the same information to each and every news outlet. Then send her away. However, if she is willing to be reasonable and simply has a concern, or wishes to check some unsubstantiated rumor, I will come out and give her up to five minutes, but that is it."

When Gary called again, he listened to his Security man, sighed, and headed out the office door explaining to Trent where he was going.

He arrived at the front gatehouse and the special room kept to the left of it. The walls and ceiling were filled with sensors to detect everything from small knives to explosives, and the doors could be shut and sealed in case of an emergency.

Gary stood outside the door. "She's clean except for a hidden recorder in the bottom of her purse."

"What about her demeanor?"

"She's very young and very passionate about doing her job, Damon. Told me her company has received information that we have are harboring some sort of spy or something in Tom's crew and demands a firm denial on our part and an exclusive if this is new information to us."

"Okay. Come on in with me, but try not to look menacing, just concerned." He patted Gary on the shoulder and reached for the

door handle.

"Hello. I'm Damon Swift," he said extending a hand to the young redheaded woman. She couldn't have been more that a year out of college, if that. She took his hand and gave it a single shake.

"I'm Emily Lipmann, one 'p' and double 'n' and I must tell you I am not one to be kept sitting around while you smug industrialists devise ways to lie to the American public!"

Damon nodded. "Normally I'd suggest we take a seat but I can see you've come with an agenda of disbelief and anger, so this will only take us a minute. We'll stand. Oh, and I assume your recorder is turned on and you've performed a mic check." She turned red but said nothing. "I do not care if you believe you have some great angle, or have made up something to try to get a jump on your competition. You are in the business of news *reporting*, not news making. If you and your agency cannot live by the rules set forth by the President of this nation regarding the Eris situation, then you will be removed from the list of those we keep informed and those we invite to all future news events. Clear so far?"

His gaze had taken on an almost angry snake-like quality that, frankly, the girl cowered back slightly from. She nodded but started to open her mouth. He beat her to it.

"So, you have come here with a threat to release some terrible, dark secrets about us. Tell the public what horrible people we are for not giving you special treatment. You go back to your bosses and tell them to expect a call from the White House about your appearance here today. With that, Miss Lipmann, one 'p' and double 'n' I bid you goodbye. Mr. Bradley here will escort you from the premises."

He turned, winked at Gary, and left the room.

Back at his desk he placed a call to the White House Press Secretary and informed him about the visit. The man was furious and promised to take immediate action.

Evidently stinging from the official rebuke given them by the White House, Consolidated News Broadcasting spent what turned out to be a considerable sum in offering bribes to certain individuals within the Swift set of companies the next day for special information about what was going on. Each and every person approached turned over all contact information and specifics of the bribes offered—in two cases this included the

actual money that had been handed them—to Harlan Ames who turned it all over to the FBI.

Because they could not openly admit to attempted bribery, CNB decided that revenge would be their weapon and they set out on another costly effort to uncover anything they could about any of the men on the mission to Eris.

They found an easy target in Duanne Dimmock. With his conviction, but no jail time, for the earlier murder of his sister's attacker, they built a huge story of corruption at Swift Enterprises with his "hidden" past as their proof of the deviousness of the Swifts. One article stated, "That the Swifts would willingly hide this murderer's actions from the public, and place humanity in the hands of a known killer, is unconscionable."

* * * * *

When Tom radioed his father with the latest about the planet, the older Swift was concerned, but said he had some other news, and told Tom and Bud about the CNB problem and their release of Duanne's past. Tom was horrified.

"How could they spread lies like that? What are they trying to do?"

His father replied, "Anger at not being given exclusive information to get a jump on their competition. At first it was only an inconvenience to us, but a credible one as we know. Everything was being done to keep it from happening but they lashed out in their corporate anger. They were trying to make the news instead of reporting it. It is about to backfire on them, Son. Tell Duanne about it as he will need to be in on any lawsuit against them if they insist on remaining public with it, but based on I've heard from our local FBI man, Agent Narz, and also from Pete Quintana in Washington, the head of their news agency is about to find himself in more hot water than he will be able to handle."

He told his son that the owner/manager of CNB, a New Zealander with a reputation for believing himself to be above the law, would be under Federal indictment by the following day and his news agency shut down inside the U.S. for ignoring the President's official decree against stirring up panic over the Eris situation.

"If the report I've been given is right, he will be allowed five minutes to make a total and unreserved retraction of that story and to issue apologies to all injured parties or face deportation and having the company stripped from his control."

After signing off Tom asked Duanne to join him on the lower level. They met opposite the kitchenette and Tom explained what had transpired.

Duanne listened, sighed and shook his head.

"I'd really hoped to spare my family the embarrassment, Tom. You see, only my late father knew that I'd killed that man. Mother, my little sister and everyone else only knew that she had been attacked and that I had fought the man off. They understood he died but the story was he got hit by a car trying to run away from police. Now…"

"Now, there is no reason for you to think badly of yourself, or for those around you to. I certainly do not think anything other than the fact I'm happy you are with us. Besides, according to dad it could be over soon. They did this as some sort of tantrum for not being given the chance to spread rumors about what we are doing out here."

Anything else Duanne might have felt was set aside when Mr. Swift radioed with new information about the situation several hours later. The electronics man was woken from his sleep and joined Tom and Bud in the cockpit.

"Tom and Duanne, I have something of interest to you. Tom may appreciate this more but here goes. A follow up news article regarding the release of what was supposed to be sealed court information about Duanne's past has hit the news services. In it the author goes into detail about how the CNB people started all this when they were contacted by a disgruntled former employee. Don't say a thing yet, Tom. It goes on to detail how CNB paid this former employee nearly half a million dollars for the story and how they were ordered by the court to suppress it, but ignored that order. Now, who was this employee you ask? The nephew of one Daniel Perkins of the *Shopton Bulletin*. And who wrote and released this article pointing the finger directly at both his nephew and CNB? The same Dan Perkins. It would appear that Dan is truly trying to make good over this and has helped get us all off the hook."

"That's great news, Dad. Thank you from me and from Duanne."

Before signing off, Damon replied, "Glad to. But the big news is that CNB is being forced to retract the entire story, admit to fabricating some of it and not fact-checking the rest, and to pay Duanne and his family a fine of one million dollars, or face being cut off from all White House and Pentagon news briefings from today forward."

“Well, Duanne,” Tom said as he put the radio back into standby, “looks like you will have a little pocket change when we get home.” He smiled at his electronics man.

“Not me, Tom. My sister. She’s never really recovered from the experience of that attack. Has trouble holding a job because of depression. Maybe this will give her some closure and let her get away for a while. All I know is she and I need to have a long talk.”

Duanne, now more relieved than he had been in years, left and went back to bed. Tom and Bud looked at each other for a moment before the flyer spoke.

“So, with one momentary panic situation over, what do we do about that mess?” he asked nodding at the image of the ramshackle planet on the monitor. “Do we go ahead and try something new or do we give up and head home?”

“Tell me what *you* think, Bud. Have we tried all the tricks we brought with us?”

The dark haired young man shook his head. “Nope. At least I don’t get the feeling in my gut it’s time to abandon all hope. You know the feeling… when you’re in a plane that is starting to fall out of the sky. Your mind races for what to try; what do you do next that might save the situation? It hits me in the gut and there comes a point where that gut feeling says, ‘Get out!’ I’m not feeling like that right now. Maybe it’s that we’re not in a do it quick or die situation. I don’t know.”

“I know that feeling. It’s the one that keeps military pilots from punching out of a stricken aircraft at the first sign of trouble. What’s that saying? ‘Rookies rocket but pilots persevere?’”

“Yep! That’s one Deke Bodack told me when I was on that military maneuver with him. So we keep moving forward is my vote.”

They brainstormed a few ideas but the one Tom kept coming back to had to do with the magnetic aspects of the planet pieces.

“I have the feeling the core was the positive pole and everything outside of that was negative. Or vice versa; it doesn’t matter. I’m not even certain if those pieces have a positive and negative arrangement. There are some instances in nature where items have only one or the other magnetic pole. If that’s the case then we’re sunk unless we can figure out what was more part of the central core than crust. Even then if we can’t locate enough of it, we still might not be able to stick the other pieces onto the

thing."

"Do we know what happened to that core? It sure isn't hanging around here from what I see."

"Right. My best guess is that when we went home it cooled to the point where any residual deep heat caused it to crack apart. Maybe even shatter. A lot of the smaller bits around here are probably former core."

Even though it would mean the planetary pieces would drift a few hundred miles apart again, Tom wanted to take a full day to run simulations of potential solutions through the ship's computers. Everything he tried seemed to pan out partly but fail in other ways. His initial thought to try to flip over some of the crust pieces to reverse polarity seemed doomed to fail because of the curvature of each piece would not allow them to come in close contact.

Several conversations with people back on Earth told him there was no practical manner in which he might reverse polarity of the curved chunks, although one elderly scientist had suggested they simply use a large degaussing coil until he was reminded the planet was more than fifty astronomical units from Earth and the coil would need to be some three thousand miles in diameter.

With apologies, the man had suggested it might be time for him to "get back to taking my medicines."

The one practical test he could perform involved using one of the smallest pieces of the interior of the planet. By using a mule to rotate it around he managed to stick it to the underside of one of the largest pieces of the crust.

It proved there was a positive and negative pole relationship to the planet's materials. But the hold was tenuous at best and a small nudge dislodged it.

On hearing that report, Mr. Swift had offered to spearhead development of Tom's glue foam concept but had to admit it was both a long shot and would require several months just to re-outfit the *Sutter*.

"For all that you might just as well come home and work on it yourself, Son. You'd probably get better results than I could. Besides, for that huge ship to get out there it will need your black hole… or perhaps one larger that we don't have sitting around in inventory. I only wish I could be of more assistance to you on this or perhaps helped you better prepare for the trip."

"Don't worry, Dad," the younger Swift assured his father.

“There are so many, many things we could have barely anticipated until either we got here or the collision happened. Now, we’re all scrambling for answers. We’ll keep trying a few more things, but from a supplies standpoint we’ll need to head home in four days. In the meantime, I’m going to transmit a private message for Bash; can you get it to her for me?”

His father assured him it would get into her hands within minutes of arrival. “Can I tell her to expect you home in about seven days?”

“It could be sooner by a day if nothing works up here. I’ll report again in about twelve hours.”

“Would you like some possibly good news? Here it is. The French issue with the space station is now moot. Fortunately, with nobody inside, the hub integrity broke, right in those recesses for the tracks, and it lost all its air. They are abandoning their station idea as being too costly and dangerous.”

Of everything they might attempt the one thing that bore some small fruit was the reversing positions maneuvers. If nothing else, it kept the larger pieces from moving apart at the same rate. They still drifted but at barely a third the original speed.

It wasn’t the solution but it could buy them some time.

Tom had left the details and mule handling to the rest of the crew. He and Peter remained inside where he worked tirelessly at a computer console while the other man kept watch in the cockpit.

“You’ll have to show me how to fly this thing before too long, skipper,” Peter had suggested at one point. “I’ve studied the controls and dials so much I can visualize them in my sleep!”

In spite of the tense situation and his fatigue, Tom grinned. “But, if I did that, then what would Bud do?”

Tom had been half serious. The more he thought about it, the more he realized that on voyages such as this one, where crew count was small and there were many things to accomplish, it could turn out to be vital that every member had the ability to get the ship out of danger at a moment’s notice.

It was something he had no time to work on now, but he made a note on a growing To-Do list in his tablet computer.

The work going on outside was slower than simply dragging the big pieces together. It required numerous mules working together to tug a little here, push a little over there, spinning

pieces slowly around one or even two axis points until they were reoriented before nudging them to touch as lightly as possible.

One mule was lost—crushed—when its operator could not get it out of the way of two large approaching pieces in time.

When the last of the big chunks had been moved and the men came inside, they all rested while Tom sat and watched the results.

Things seemed to remain mostly as positioned with a few of the smaller chunks starting to wander by feet then yards after the first several hours.

It was disappointing, even though the young inventor had known going in that it was a long shot.

When Tom reported to his father the process of trying to reverse the pull on each of the major pieces, and the not-quite-there results, Damon remained silent for an extra minute after the normal transmission delay.

When he did speak, his tone seemed sad.

"I'm afraid I have some bad news for you, Son. The best geologists in the Western world have been mulling this over and have come to the conclusion you are *never going to succeed*."

CHAPTER 19 /

"WELL, BUD, WE TRIED..."

WHEN BUD slipped back into the copilot's seat he asked what had happened, Tom informed him he now believed the magnetic pull of the individual crust pieces was never enough to keep them together, which made Bud let out a groan.

"Jetz! So, the good guys don't win after all!"

"No. It isn't that, Bud. It's just that the core was... well, it was *core* to the entire planet staying in one piece. Dad and some very eminent geological scientists have concluded that it was the molten magnetic core holding things together. It might have been a case of the planet's shell was already cracked along all the various plate lines, and only dust and small debris collected by gravity over millennia gave the surface a fairly smooth appearance."

"Oh. Would that mean it was already in pieces and little Dysnomia just broke the slight attraction?"

"That's exactly what their thinking is, Bud. It also explains why Dysnomia wasn't much damaged in the collision. Sort of like having a bowling ball roll into a formation of pins. They fall to the sides and down, and the ball just keeps moving without getting a scratch."

"Only *this* pin shattered."

"Yes. Just that."

They sat in silence for a few minutes, both lost in their individual thoughts. Finally, Bud squinted and looked at Tom.

"That ought to bring up the question, again, of whether we pack up and go home now or keep trying different things. I gave you my opinion once but now it's beginning to feel like a safe ejection is going to get more and more tricky the longer we hang around."

"You're right; it does, but I don't have an answer for it. Not right now. I think we owe it to ourselves and to the former ball that was Eris to try this repositioning of the planet's pieces even if it turns out to be just a 'make work' thing. In the mean time maybe something will come to us or to the people back home."

Bud didn't hear his friend sounding so weary and downbeat very often. It was as jarring as being slapped across the face. In

fact, it stung him.

"I hate to say it, but I think we've completed that phase of things. I did have sort of an idea when I was outside. And, it has to do with what you planned to do back in the asteroid belt."

A look of curiosity came to Tom's face. "Okay," he slowly said. "What is that? We don't have the cables and winches as we have already discussed if that's what you mean."

Bud shook his head. "No, but we do have the mules. Correct me if I'm wrong, but on normal power output they can run for what? Five years? More... less?"

Cautiously, Tom answered, "If they run their Attractatrons constantly, let's say just two of them, at fifty percent output the power pod ought to be capable of keeping that level of drain up for four years, plus or minus a few months. Why?"

"Well, I know you don't really want to leave them all out here, but if they could be spared *temporarily*, if you knew you would be coming back out with some other solution and could pick them all up then, why not use them to hold Eris together now? Form a central core with them all back to back. I'd guess they could be clustered in a rough circle a couple hundred feet across and then hold onto the larger pieces just far enough out to form a sort of false crust. If the smaller pieces get shoved inside then you sort of have a makeshift planet. Right?"

The inventor sucked air in through his teeth. "Well, sort of, and I hate to burst your growing bubble, but unless we have a surefire way to keep smaller pieces from drifting into the path of one or more Attractatron beams and getting yanked into one or more of the mules, that might work for a short time, but with the inherent magnetic attraction and repulsion going on, everything will drift. It's doing it right now. Eventually we'd have a mess and possibly a bunch of damaged equipment."

"All right, then here comes the Devil's Advocate speech. Why bother with one more round of moving things and flipping things and trying to organize things when it will all come to naught?"

Tom looked at Bud and shrugged. "I think it is a case of we've tried the logical and now why not try something desperate? Why not try to see how the various pieces want to arrange themselves. We move a few into close proximity and wait. If they move apart a little we turn them a bit more and wait again. At some point this magnetic property of the blasted planet ought to work in our favor."

The rest break was coming to and end so Tom asked Zimby and Hank to come up and take over while he and Bud and Red and Jon went out to try what was probably going to be the last ditch effort.

"Sure, skipper. But, you've been burning the candle, as the saying goes, at both ends. Let's get some other pair up to spell you and the flyboy so Zim and I can be your surrogates outside."

Tom was about to protest when he realized his mind had wandered during that short conversation. He'd gotten the main idea but the individual words now seemed distant.

"You're right, Hank. I am beat. So, you send up a couple well rested guys from the crew and Bud and I will meet the four of you in the lower lounge in, well, how about five minutes?"

"Will do!"

Once he explained the simple maneuvers he had in mind, and the boring waiting time they would need to endure, the four men smiled and nodded. "Got it," was the general response before they got up and went to get into their suits.

As they prepared to get into the little airlock/elevator Tom suggested to Hank they could start the maneuvers and come inside for the waiting part if they wished.

"Nah. It's beautiful out there. I kind of enjoy looking in at our sun. Its far enough away and the helmet can keep the glare down, so we can stare at it. Besides, if something goes awry we'll be right there to fix it!"

Tom went up to the mid deck and his little room and was barely in his bunk when he fell asleep. He remained that way for more than seven hours before his body woke him feeling very hungry and in need of the bathroom.

Bud was back downstairs munching on some toast with honey. He shook his coffee cup at Tom asking, "Can you get me a refill, waiter?"

When Tom came over with his own food and two coffees he sat down with a sigh. "Any news from outside?"

"Nope," Bud stated around a mouthful of toasted bread, "but I did hear they are due to come inside about thirty minutes from now. Then, I guess we see if it's time to leave or if you've hit on a winner."

Tom snorted. "I wish." He had reached the point where all ideas sounded the same to him, and none of the ideas in his head appeared to hint at success.

When the four men came in and took off their space suits the news wasn't very good.

"Sorry, Tom, but we've run into the same old thing. Pieces touch, pieces hold together for a little while and then they *un*-touch and begin drifting. Without some sort of stickum I think we've come to the end of the trail," Hank told him.

"Are they moving any faster or slower?" Tom inquired looking for any glimmer of hope.

The big man shook his head saying nothing.

Within ten minutes everyone other than Duanne, who had volunteered to take cockpit duty for a few hours, came down to see what was going on.

"I have a question about the magnetism," Jon asked as the crew sat having coffee and cocoa.

"Go ahead," Tom invited.

"Okay. I know about iron and magnets and all that, so we can dispense with the Professor Science kiddies program stuff. And you've already told us there is some iron but not all that much in the rocks. So, how the heck can the entire planet have had so much magnetic action going on?"

For Tom this was kids stuff, but the understood that not everyone knew that iron wasn't the only metal prone to magnetism.

"Well, Jon, and anyone else who is curious, while ferrous metals are the most common ones we associate with magnets, the truth is that simple nickel and cobalt can…" he paused and looked at them. "And that, gentlemen, is the answer. I was about to say that cobalt is another one, and guess what formerly intact planet has loads of cobalt in its *core* makeup?" He saw them all nodding. "Oh, and the other common, although actually a rare earth element, is neodymium which is about the strongest naturally-occurring magnetic metal there is. On Earth."

"Then it's too bad old Eris wasn't full of neodymium," Hank stated. "I've tried pulling two neo-magnets apart and it just isn't possible using even my near superhuman strength." He grinned and accepted the razzing the other now gave him.

"And, it is too bad the core scattered. My guess is it was full of nice, magnetic cobalt and that kept the planet together!"

Following a conversation with Mr. Swift Tom announced later that day they would begin the process of "buttoning up." In other words, the crew was about to start getting everything prepared

for their flight back home. For the most part people were relieved, but also disappointed.

Everyone acknowledged there was nothing they had done or failed to do that led up to the collision. The opinion of scientist back home, as well as in the *TranSpace Dart* was that Haley's Comet had some sort of core that had been influenced by the magnetic attraction of Eris or the dark object farther out nobody could see.

That had been the chief cause of it veering in enough to slam into Dysnomia and the destruction that resulted.

It still didn't make anyone feel particularly happy.

For starters it was decided that the original two mules—the one that still worked and the one that did not—could not be outfitted to hang onto the fins, so that left them with one that hopefully could tag along and one they would finish parting out and simply leave the hull pieces where they were.

Duanne asked for permission to try something with the functioning original mule and Tom, with a shrug, told him to go ahead. It would never be fully useful without a rebuild that would cost nearly as much as the mule had in the first place, and it probably could not hurt the situation.

Duanne's idea was to create what he called a "border collie from a mule." With some special programming Tom offered to lend a hand on, the one mule would remain out here flitting from place to place trying its best to keep the largest pieces from drifting too far away. His idea had the added benefit of allowing them to pull three or four of the largest chunks into close formation that could be used as a pushing point for the ship's repelatron to get then headed back home.

"Duanne? That raise and bonus I mentioned the other day are now definitely yours!"

Four of the crew remained inside cleaning and straightening things, getting anything loose put away and generally making the ship safe for the return trip.

The others were outside maneuvering the various mules back to the ship and prepping them for the voyage.

Tom and Duanne finished their project about the time Bud reported the mules outside were in position and could be set to automatic when the time came. The inventor told them to come on inside and have some food while he went over the plans for the trip back.

As they sat in the lower level eating and discussing the return trip, and what might be done at a later date to try to glue the planet back together. Jon stopped suddenly, a surprised look on his face, and raised a hand.

Bud, thinking he was choking, jumped up and rushed around behind, getting him into a bear hug, the Heimlich Maneuver. But, before he could squeeze, Jon shouted, "Cut that out, Bud!"

The flyer released him and stepped back, looking confused. "What? I thought you were choking?"

"Hardly. But, I had something come to mind. Tom," he said turning to the inventor, "tell me about the magnetism again. Mostly, about how the planet was magnetic and how you think the center that we can't find was the positive pole."

Tom repeated what he previously had stated that he believe the center was either the positive and the crust the negative of a planet-wide magnet, or the opposite which would act the exact same way.

"Now, tell me why."

Jon had a curious glint in his eyes. "First, *you* tell me why the moon of Eris, Dysnomia, ever stayed in such a low orbit and moved around the planet in what must have been far too slow an orbit to be maintained."

Tom stopped and thought about it. It was a good question and —

It hit him.

"Jon? Are you being positively brilliant or what?"

A chorus of voices from the men around them all said, "What?"

Tom laughed. Jon joined in with him.

Bud, looking confused, said, "No, Really. What?"

"I believe our Mr. Wolff has hit on something incredibly insightful," Tom stated. "To answer your question, Jon, there is no good reason Dysnomia should have ever been captured by Eris in the first place. I believe they wandered here separately and just hooked up in the distant past. No good reason why it should get as close as it was without crashing into the planet. And, no reason other than what you are thinking about for it to remain there in what might be described as an exaggeratedly lazy orbit. No reason other than magnetic *repulsion*."

Hank stood up as the realization also occurred to him. "Wait.

That means that Dysnomia would have been the same charge as the crust? So, as it moved around it kept getting shoved away. But, that means…"

He didn't finish the statement before nearly everyone else believed they got the idea.

Like magnetic poles repel! But, that couldn't be right.

"I think there is a good case for the moon and the core to have been the same charge shoving away from each other and the crust was simply caught in the middle of a shoving match and held down." Tom looked at Jon and asked, "So, do you want to explain what we are about to do?"

Wolff looked at the inventor. He seemed a little unsure now. "Uhhh, I only got that far, Tom, to be honest."

With a small nod of acknowledgement, Tom proceeded to tell the team, "We are about to go out and capture a wayward moon, bring it back here or as near to the original position of Eris as is practical, and start packing pieces of its former mother planet onto it. In other words, we are going to build ourselves a single planet out of the remains of both!"

Now, Jon realized this is what had been hovering around in his brain but had not made it as far as the "good idea" point. They would reconstruct Eris using its moon as the new core.

"What eventual size are we going to get?" Peter asked having joined the rest a few moments earlier.

Tom pondered it a moment. "Unless I miss my guess we ought to have something nearly the same size as before, just minus a moon. The nice thing about doing this is we will be working with materials that naturally want to do what we need them to do. In other words, stick together. Anything that doesn't stick will drift away."

He now grinned.

"What is that look about?" Bud asked seeing Tom's Cheshire Cat look.

"Oh, something occurred to me. The small pieces will drift off, but if we can find a way to pulverize some of them to be fairly fine perhaps we can replace the moon with some manner of rings."

"Leave it to Tom Swift to take a broken little planet and turn it into a model of Saturn!" Red Jones muttered.

CHAPTER 20 /

...AND THEN IT ALL COMES TOGETHER

TO START the process it became necessary to double up the mules. Because the individual large pieces of the former Eris had now drifted again some thousand miles the only way to create an absolute center point was to put two of them back end to back end and then use the inward-facing mule's Attractatrons to hold onto a center point. That point was the small moon that had caromed off almost directly in the former orbital path.

Tom, Bud and their crew spent two days latching onto the moon—now renamed Centrallis because it was destined to be the center of the reconstructed planet—and positioning it in the most advantageous location.

Knowing they would never be able to exactly replace the planet Tom decided to settle for building the new Eris just fifteen thousand miles from where the original would have been by this time.

Careful studies of each piece they would manage to use along with density information provided about the former moon by Bob Jeffers told him the new planet would actually be about seven percent heavier than before. At some point in time this would have an effect on its orbit that might require adjusting, but that would be decades in the future.

The retrieval and repositioning of the new planet core was accomplished and the crew took a short break.

Their supplies of food and everything else necessary to maintain their health and lives demanded they take not longer than an additional nineteen hours to finish their work and get underway back for the Earth.

The question of using Eris as a point to push against came up in conversation and Tom admitted they needed that repelatron push to get going, but it needed to be carefully and gently exercised.

"We'll compute the exact point and moment to press against the largest piece of the crust. That will get transferred down into the core. If we do it right, we can even impart a small spin to the planet that should assist in stabilizing everything."

Next, the mule sets were sent out about halfway between Centrallis and their target pieces. This was the trickiest part of

the early operation as it meant constant communication between the duos telling the others where they were, what they were targeting, composition, and plotting courses to avoid any possibility of overlap of their Attractatron beams.

"Are we going to have to sacrifice the mules?" Zimby asked Tom as it became clear the only way to really pull everything tightly together—magnetic attraction or not—was to have them use their Attractatrons to yank things inward to Centrallis.

"I'm hoping we can be a little creative, Zim, and also do some piloting magic. I'd like the little fellows to come back with us. Or, at least most of them. I'm thinking we leave one or two out here just in case something else wicked this way comes. They can be the new Eris II's protectors."

Zimby smiled. "I like that. It somehow seems fitting. But, will we ever come back out to visit them?"

"I think we will. I also think one of the things I want to do once we are back home is come up with some type of foamy material to shoot into all the cracks and crevasses. Something that will expand, even in the icy vacuum out here, and not just fill in places, but actively stick things together."

"That'd take one heck of a big ship, skipper. How would we get enough of whatever that is out here?"

Tom tilted his head to the right. "Think about it, Zim. What do we already have with a huge carrying capacity? Something that can have tanks and tanks of materials inside and still have room for some sort of Attractatron unit up front so we can try using our friendly black hole?"

Zimby groaned. "Stupid me. The *Sutter*!"

"Right. But, that's in the future. For now we have planet chunks to wrangle back into position around our new core. Let's go!"

The twenty-one minutes it took to get everyone back outside had Tom promising himself that before the next time the *Dart* left Earth's orbit he would outfit her with a larger, more convenient five- or six-man airlock up by the living quarters.

There was room for one just below the lower deck opposite the kitchenette with its food storage system below. But, that was for another trip.

He gave the men some last minute suggestions on how to accomplish their newest tasks and then let them go to it.

By using triangulation techniques, two mules could maintain

a position far enough out to allow a third to grab onto various small pieces. These were moved down to the surface of Centrallis where they—as hoped for–stuck like they had been glued there.

The magnetic attraction that had worked so much against them was now their friend and ally in reconstructing the planet.

Hour by hour the surface became dotted with pieces as small as a few dozen yards then spaces were filled with larger and larger and even larger pieces.

As the planet grew the stability of the surface increased and so the speed at which they worked hastened.

Still, it would be a very close thing.

So close that Tom was making plans for the final day of their trip home to be spent inside spacesuits, hopefully sleeping as much as possible.

He pulled no punches in keeping the crew informed of their situation. By unanimous acclamation they voted to continue until the very last possible moment to keep placing more and more bits of the planet down on the surface.

"We have one thing going for us now," he informed them over their suit radios. As the planet gets larger the overall gravity increases and I'm seeing signs that small pieces that have been floating around are beginning to head down to the surface. Nothing larger than a basketball right now, but we might get this to the point where it will attract new materials out here and continue the slow rebuilding of itself."

The point of departure was growing close and only three pieces of the crust were still to be settled into place. The farthest out any of them sat was a mere six hundred miles.

Tom had to make a decision, so he radioed home and got his father's input. Ten minutes later, with the last pieces now heading downward he sent out the call.

"Everyone come back inside. It's time to let the planet draw those final pieces into itself. We have to get the mules reattached to the fins and program the others to hold on. Come in now, and that is an official order."

He added that last because he sensed that people like Hank and Red might dally out there with the excuse they only had 'a few little things to do.'

The men were exhausted and came in as quickly as the elevator could transport them from the base of the ship to the living quarters.

Bud was among the first two in and he headed for the cockpit where he and Tom got started reattaching the eight mules to the fins.

It went more smoothly than anticipated, something Tom could only think was the result of all the remote control time they had gained during the previous week.

Duanne came up and took Bud's spot so he could send out the programming to the other mules.

"I worked this up a few nights ago when I took a turn up here. Ought to make them all behave as a single unit."

It worked so well that Tom was left feeling he had rushed everyone back inside perhaps as much as an hour early. But that feeling went away quickly when the report came that Red Jones had collapsed in the lower level trying to get out of his suit.

His condition wasn't serious but his weariness had meant he blacked out when he bent over to loosen the boots of his suit. The lucky thing was the lower gravity kept him from hitting the deck as hard as he might have.

"Sorry, Tom," he said as he was helped into one of the acceleration couches. "I should have listened to you when you explained that fifty-two isn't the same as twenty-five. It's just that I want to feel I'm pulling my own weight so you won't leave me behind on these trips." He stared into Tom's eyes, a hopeful look on his face.

"Red, you've been pulling your weight, plus. Even Doc took me aside last trip out here and suggested I try to slow you down. So, if you will pardon a kid's opinion, you're not old and you are certainly not past it, but you do have to only take on as much as your captain gives you. Okay?"

"It's a deal, only as long as you promise I keep getting invitations to these dances."

Tom smiled and patted Red on the shoulder. "I'll keep your dance card as full as I can. Now, let one of the other kids fix you something to eat and get a good, hot drink in you, then we'll cover your old legs with a woolly robe and let you nap, gramps."

Red rose partway up. "I'll gramps you!" but he said it with a smile on his face.

With fifty minutes to spare on the clock Tom used much of their remaining maneuvering fuels to get the ship underway and headed for the parking spot of their black hole. It had patiently been waiting there nibbling at a few stray pieces of Eris that had the misfortune to pass too close.

Bud suggested that it was looking a little smug.

"Give a black hole a little bit of yummy planet to munch on and it gets all fat and happy."

In minutes the ship and its main power source were attached by Attractatrons and had spun so the tail end pointed to Eris II.

Tom gave the ship some forward momentum using the chemical rockets before energizing the repelatron at the back onto the surface.

His careful calculations had them waiting a few extra minutes because of being ahead of schedule, but right on time they all felt the shove and ship with its black hole leading the way headed back toward the center of the solar system.

Hour by hour they picked up speed. This time, without something more solid to press against, Tom had to be satisfied with only getting the ship up to .88 speed of light. They would get home in time to avoid having to don their spacesuits, but only by a matter of a few hours.

* * * * *

"Glad to have you coming home, Son," Damon responded when Tom called to say they were crossing the orbit of Neptune. "I know of one young woman and a little boy who will be especially pleased. Before I let you talk, I wanted to read something to you. Came over the news services this morning from our good friends at the heart of the Kranjovian government. It reads like this:

> News flash, Kranjovia 1345 GMT. An important bulletin has been issued by our illustrious government to inform the people of the world that it has been announced that the crisis in space has been averted due in large part to our expertise in matters such as had been faced by an ill-trained and unprepared crew of misfits managed by juvenile inventor and would be adventurer, Tom Swift.
>
> Totally faced with dangers he could not handle, and with guidance on a continuing basis from our scientific community, an explosion of great consequences was avoided on the planet of Amlis.
>
> Although it is well known the United States and particularly the Swift company will attempt to deny our unmistakable and necessary intervention in what would have been a doomsday situation for the entire solar system, let it be known that we hereby claim Amlis as ours due to our involvement. Without Kranjovian help we

would have perished within days of the explosion we managed to avert.

We, the free people of Kranovia hope that the United Nations organization will find this to be the conclusive proof that we should be recognized and allowed voting membership in that international group.

There was a moment of silence followed by, "So, Son. What do you think of all the great help the Kranjovs provided you?" As he set his radio for receiving Tom's reply, his last sounds were a hearty chuckle.

"That is quite interesting," Tom relied. "In fact, it is nice to get the name of the planet that was identified years ago by the decadent Western World as Eris finally correct. Maybe, we went to the wrong place after all. We never made it to this Amlis. Funny though. Even with our being there *Amlis never exploded*."

"The State Department is working on a press release putting the Kranjov release to the fire and showing how it is one hundred percent fabrication on their part. Plus, I have been reliably informed that the U.N., rather than opening their arms to the Kranjovs, will be officially demanding a full retraction of their false claims or face a permanent ban on membership. We'll see. In the meantime, their Ambassador to Canada was booked on one of the Sunday morning news interview programs for one hour after that bulletin and showed up only to be booed and laughed at and heckled by a crowd outside, so he got back in his limo and the sped off."

Tom passed the word to the crew of the Kranjovian claims; they universally proclaimed the unfriendly nation to be, "populated with fools and idiots!"

Duanne said, "Let's get home and show them what a real group of heroes looks like!"

* * * * *

When the *TranSpace Dart* settled down on its fins and the crew disembarked, it was accompanied by the sounds of a cheering crowd and to worldwide media coverage. The President wanted to play their return up as much as possible.

In every corner of the globe where a signal could reach and a television or radio was available, it was almost certainly turned to the momentous occasion.

Word had originally spread like wildfire concerning the reason Tom Swift had left the planet. Even after the official

announcements and the frequent updates, public opinion was sharply divided between the believers and the people who distrusted anything any government might tell them.

With so much at stake, and rumors running rampant—a fire fed by the brouhaha stirred up for a few days by the CNB affair—the opinion tide had returned to a split decision.

The single thing that turned the table of public opinion was a live video feed Damon Swift of Tom floating outside the *TranSpace Dart* narrating the video everyone was seeing in near real time of the newly reformed Eris settling into its new, somewhat irregular shape. The video had begun with the landing of the final piece of crust onto Centrallis/Dysnomia. Today the world, with the exception of the Kranjovian government, were nearly one hundred percent behind Tom Swift and what he and his crew had managed to do for the benefit of mankind.

Tom and Bud held back a moment as the other men of their team disembarked.

"Flyboy," the inventor said to his best friend, draping his right arm over the other man's shoulders, "I don't know about you but I am getting the feeling we're a bit too old to be doing this all the time. What do you think?"

Seeing that Tom was serious, Bud pursed his lips, made a sucking noise with his tongue against his teeth, and smiled.

"I think that I can see two women, plus one little boy, out there who have been thinking that since we turned nineteen. Here we are about to both hit twenty-four and there's no way we can get any more famous. Right?" Seeing Tom's slight nod, he continued. "So, I'll make you a deal. If you promise me no more adventures any farther out in space than, oh, the asteroid belt, then I'll never bother you for another present, birthday or Christmas, ever again."

"Deal."

They left the ship via the two-man exterior elevator platform running down the fin closest to the main audience.

When they got no closer than fifty feet from the raised dais, Bashalli—with little Bart in her arms—and Sandy rushed forward throwing themselves into their husbands' arms.

Almost at the same time, they each said, "I am so proud of you," and smothered their respective spouses in kisses.

Bashalli whispered that she'd received his private message and was hoping they could get home soon. After all, she had

some packing to do. The new Swift Space Station had just been totally sealed up and was about to get its first gardens planted even though the dedication ceremony was at least a year away and the official "open for business" hung out. When the time came Tom intended that she was going to be the one to crack a champagne bottle over one corner. It would be her very first time floating in space and she had been worrying about what to wear under her space suit.

Plus, he had also asked her to be part of the private ceremony opening the second line at the auto company and that was a month or so away.

So much to do, so many outfits to coordinate!

Tom made a small speech to address his version of the adventure and what he now believed was the safe and stable condition of the far-out planet.

"I do have some bad news, however. Back in nineteen hundred eighty-six Haley's Comet appeared in our skies on its regular trip through the solar system. That will have been the very last time we will ever see it. Due to the collision it encountered with the planet Eris—that's the one we have somehow managed to pull back together—it shattered into hundreds or even thousands of pieces. Some were flung off to the sides and our estimates are they will eventually come back into close proximity to our sun and finally melt. Nothing of what was left will ever be a danger to our planet or the Moon or even our Martian colony. They are all far too small."

He waited for a murmuring to subside.

"My crew retrieved a chunk of Haley's Comet and that is in the deep freezer of this ship behind me. It will be turned over to the best possible scientists for study so we will finally know what a comet is made of."

He thanked the crowd present and the audiences around the globe and then begged off of any questions.

"I believe there will be a follow up press conference at Enterprises in two days. I will answer questions at that time. Right now it is time for me to go home, hold onto my wife and our son, and get my feet firmly planted onto our planet's soil."

"Will that be as in forever, Tom?" Bashalli asked him a few minutes later as they headed for the *Sky Queen*.

"Bash. That is my intention and my promise and I hope like the dickens I can hold myself to it!"

He would, at least for a while as his next adventure would keep him almost completely in Shopton as he worked on *The NanoSurgery Brigade*.