

TOM SWIFT

And The  
*Solar Chaser*

BY

Victor Appleton II

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THE NEW TOM SWIFT INVENTION SERIES

# Tom Swift And The *Solar Chaser*

By Victor Appleton II

There have been many, many contests in the scientific and engineering communities including the first one Tom won with his *Star Spear* two-man rocket, the first privately-funded rocket to orbit the Earth with passengers.

Now comes a new challenge that intrigues the inventor: fly *nonstop* around the world using only solar power and make the trip in less than thirty-six hours!

With the best anyone has managed coming in at five weeks and more than twenty, multi-day set down points, Tom isn't certain it can be done. But, he has time on his hands now that his fight against the Brungarians out to steal electricity is finished, so he and his best friend, Bud Barclay, embark on an attempt to do what seems to be impossible.

For once it looks like there are no foreign agents or industrial spies out to foil his efforts, and nobody seems interested in beating him up, kidnapping him or someone he loves, or doing anything at all harmful. It is enough to make a guy let his guard down.

Oops!

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This book is dedicated to people who have pioneered flight at all stages and ages. To the first men who strapped on wooden wings and made those jumps, to the ones who added a deadly spinning wooden propeller, to those who sat atop turbines barely able to hold themselves together and to the men and women who sit on a highly explosive column and ride it to the heavens.



The sun peeked up over the hills to the east of Lake Carlopa as Tom and Bud turned to face their power source. **CHAPTER 18**

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## AUTHOR'S NOTE

Twenty-one novels in a single series by a single author. Boy, are my arms tired! To think, I had only hoped to get maybe five or six novels written when this all started in the fall of 2009. I have run out of ideas on several occasions only to have something keep me awake at night as the germ of a new novel invades my brain. This is one of those.

This is sort of how these things may go from now on. Other authors might tell you about all their careful planning, note-taking, outlining, and those sort of thing. Not me. I start with a title, build a preliminary cover and dive right in. I try to let my characters speak for themselves and to direct the action rather than me imposing my will over them. I believe they appreciate it because once I get into a book they just keep charging around, doing the things they do, and I only chronicle things.

Well, my original six book target became ten, then fifteen, twenty and now it is twenty-four. That is just three books away. At an average of about 76,000 words that will mean over 1.825 million words for you to enjoy/struggle through/cherish/etc.

Perhaps it isn't my arms that are tired, but my poor fingers. Now I understand how guitar players and violinists can build up such incredible calluses on their fingertips.

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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 available on Amazon.com in paperbound and Kindle editions. BarnesAndNoble.com sells Nook ebook editions of these same works.

# Tom Swift and the *Solar Chaser*

## FOREWORD

Decades ago when I was authoring the entire world of Tom Swift, I was told to keep him perpetually eighteen years old. Not that it ever made sense except that the publishers felt that an increasingly older Tom might lose appeal to the target audience of twelve to eighteen-year-olds.

Poop on that! And, poop on limiting an audience like that. Tom has stood the test of the ages and appeals to people from eight (the youngest reader I've heard from) up to people in their 80s. Why, you ask? Because no matter how old Tom and his companions are, they live and work by a set of morals and ideals that can be as inspiring as the reader wants them to be, or does not wish them to be. Plus, given today's eighteen-year-olds, I find it increasingly difficult to put Tom at that disadvantage.

And, as he and they age a little, they have picked up wisdom generally not associated with teenagers.

This adventure is mild when compared to a lot of his stories. He isn't trying to fly to the next galaxy, split the sub-meson into smaller and smaller bits, or even fight with Brungarians, Kranjovs or more realistic and modern enemies such as North Koreans. He is simply trying to do the near impossible using technology and his ingenuity.

Does this mean Tom will be ambling through this story without conflict? Hardly. He is up against stiff, determined and in one case bad-tempered competition along with the inherent dangers of experimental manned flight.

*Victor Appleton II*





## CHAPTER 1 /

### TIME TO GET BACK TO WORK

TOM SWIFT, the twenty-six-year-old inventor, son of Damon Swift, owner and manager of the Swift Companies, wandered into the large hangar at the northeastern corner of Swift Enterprises. He'd taken a leisurely walk over from the office he shared with his father in the Administration building, what amounted to nearly two-miles of the four-miles-square complex located outside Shopton, New York.

It was a beautiful late afternoon and he'd just completed a small project for the government of Mexico and had the need to get out, breathe some of the fresh air that abounded in the northern part of New York, and stretch his legs.

Four weeks had come and gone since the attacks by what Bud Barclay had dubbed the Electricity Vampires had been halted. The end result had not been to either Tom's or his father's liking, but both had relegated that to past memories and were not dwelling on it.

Standing at the entrance to the hangar his hand absently rose up and ruffled his moderately short blonde hair. The slight breeze felt good as it hit his scalp.

Stepping inside he let his eyes get accustomed to the darker lighting before walking purposefully toward a small office area to the left side of the cavernous building. It wasn't a short walk as this hangar was nearly four hundred feet long, one hundred and twenty feet wide and the roof towered overhead by more than eighty-five feet.

"Hey, flyboy," he said looking into the office of his best friend for more than nine years, and brother-in-law for the past four, Bud Barclay.

The dark-haired flyer and test pilot for Enterprises looked up from the report he'd been getting prepared to submit to the manufacturer on a small acrobatic helicopter the Swifts had agreed to test for a company in Canada.

"Hey right back at ya, skipper. I didn't hear a car pull in the hangar. You park outside?"

Tom shook his head. "Nope! I have decided to take Bashali's advice and do more walking. Now that I'm an old married man with one kid out and the other undergoing her final six weeks of construction, she thinks I've gotten a little soft around the

middle.”

Bud snorted. “Tell her you’ll go on Chow’s diet if you get too spongy. Jetz! I hear he’s lost another seven pounds and is now one hundred-two pounds lighter than his heaviest. The man is going to float away in a stiff wind!”

The friends laughed as Bud pointed to his visitor chair. Tom sat down and the two men looked at each other.

To say they were more brothers than friends would be a fairly big understatement. They had faced everything from being the first to fly a privately-funded rocket into orbit, made the first non-chemical rocket flight to the Moon, gone through a wormhole to visit another solar system, flown at the speed of light by hitching a ride behind a small black hole and even put a damaged planet back together.

Each one knew he could and did trust the other with his very life, but now with wives and Tom’s kids, they had been attempting to slow down on the really adventurous stuff the past couple years.

“Other than a good walk, you look like something might be bouncing around in that giant brain of yours. What’s up?”

Tom grinned and gave a short chuckle. “Well, Bud, the truth is I don’t know. In the back of my brain is the desire to go out and explore something new, but we’ve done a lot of that already. And neither of us is particularly anxious to leave our ladies, and my kids, for more than a day or two at most. But,” he sighed, “I need some sort of challenge. Something to get my brain all worked up and keep the cogs greased up here,” He tapped his right temple.

“Brain twister?”

Tom nodded.

Bud swung around to fully face his friend and placed his elbows on the desk. “How about something completely different? By that I mean Sandy—you *do* remember your sister, Sandy?—well she has been pestering me to go on something she calls a ‘vacation.’ Not sure I like the sound of it, but she makes a good argument for one. Along with a lot of nonsense I hear words like, ‘relaxation,’ and ‘fun,’ and even a few I cannot repeat, even to you. *Especially* to you!”

The inventor rolled his eyes a little. “Then, your wife and mine must have been talking because I’ve been on the receiving end of that same sort of chat just about every evening for the past four or five days.” He smirked. “Now, I have to say I did some research and found out that what they call a *va-ca-tion* is

actually time away from work and basically uninterrupted time with *them*. Doing what *they* want to do.”

Bud scowled. “Even if that means going shopping or looking at antiques or, horror of horrors, doing entertaining things that other people are in charge of?”

They both laughed. To be honest, it had been nearly three years since either had taken more than a week or ten days off other than Bud when he had to go out to spend three weeks while his father recuperated from a mild heart attack in San Francisco.

When they stopped, Tom asked, “Should we call one of them and tell her we give up? You know it will get to the other in about three-seconds once the words are out of our mouths.”

Bud shook his head. “No, you forget that even if Bashi stays at home four of every five work days, Sandy is still trying to do the corporate thing over in Communications. At least George Dilling lets her off on Friday afternoons to fly and do the ‘See, Mrs. Grindlesplatt, it really is a *very nice little plane* your husband wants to buy,’ demonstrations.”

Tom nodded. The truth was Sandy excelled at calming the nerves—actual and financial—of spouses of the people who would gladly open the family checkbook without consultation. She loved that part of her job at Enterprises even more than her work as a PR Specialist.

“So, what’s new with you, flyboy?”

Bud pointed to the report in front of him. “The Canadian helo. It’s... well, I believe the charitable thing to say is, it is not quite ready to be let out into public.” He grinned. “I can’t figure out who had the lead in the design, but it sure wasn’t a pilot. The thing is more glitz and shiny chrome inside—all meant to reflect sunlight into the pilot’s eyes at just the wrong time—than it is in instrumentation and even flyer comfort.”

“Like what?”

“Well, the main stick between the pilot’s legs is set with the grip at a backward angle that may match the slope of the front windscreen, but it is darned hard to hold onto for more than a few minutes before you have to let go and flex your fingers.” He got up and made a “follow me” motion to Tom.

Across the hangar from the office door was the helicopter. It was moderately small for a four-seater, but not outside of others available in kit form. This one, however, would only be sold as a complete aircraft. It sported a sleek nose piece that shot out perhaps a few feet farther than necessary ending in a camera that

gave the pilot a good downward view that was currently blocked by the long nose.

They walked around it a couple times while Tom got a fuller impression of the design.

“She seems to be a bit on the nose-heavy side and too stubby in the tail. That small ducted tail rotor must spin pretty fast to overcome the tri-bladed main rotor’s spin.”

Bud was slowly shaking his head.

Surprised, Tom asked, “It doesn’t?”

“Nope! You have to give it about an inch of left pedal to keep the nose straight in front of you. They claim they have a fix for that but all I’ve heard is they may put a bit more pitch to the six fan blades in there. The not-so-great thing is they have a tiny bit of vibration already and I’m afraid someone is going to have a more heavy-pitched fan come apart on them.”

Tom sucked in a breath through his clenched teeth.

“Do they know that?”

“Yeah.” Bud sounded tired or sad or both. “They aren’t certain how to get rid of the vibration even though I told them the drive shaft for that rotor needs to be beefed up. They like the cast aluminum one they have already. I’ve decided to only take it up one more time for a hover flight over the lake to see how it handles in prolonged stationary mode. Uhh... I’m not suggesting putting your life in danger, but do you want to come along?”

The inventor looked slightly askance at his friend. “Well, that would depend on whether you believe the tail rotor is going to come apart during that time... and also what sort of safety measures either they or you intend on using.”

Bud gave his friend a grin as they walked from the office out to see the little helicopter. “Take a look at this,” he invited as he stooped down to look at the lower part of the right fuselage. “That hatch and one on the other side have the inflatable landing pontoons to be used with this up around any of their million or so lakes. Normally you’d stop and pull them out then use a compressor to inflate them over about a minute, but I had Hank Sterling add a couple CO<sub>2</sub> tanks to pop those puppies out and open in less than a second in an emergency. He also tied that into a small sensor pack that checks for undue vibration above the current threshold or autorotation conditions or if a loud noise is heard.”

“Gee, Bud, with a safety system like that how can a guy refuse.

When are you taking her up?”

Bud looked at his watch. “Twenty minutes if you can hang around or any time after that if you have something to attend to.”

“I’ve got nothing, Bud. So, you go back to filling in that report and I’ll sit in the helo looking over the controls. Is there a key to turn on the electrics?”

“Nope. Just flip the overhead switch marked MASTER E forward and give her ten-seconds to energize things. Just don’t hit the A.S.S. button, and that is Auto Start System, to the right of the first one.”

While Bud went back to his office Tom opened the right side door, generally a passenger or co-pilot position, only to discover it was the one and only pilot’s seat and controls. He moved around to the other side and opened that door, ducked a little and slid inside.

“It’s a bit cramped for anyone over about six-feet,” he muttered. Reaching around the left side of the seat he located no control knobs or anything to allow adjustment of the seat.

*Strike one-and-a-half*, he thought.

Bud came out five minutes later and climbed in. “Snug, isn’t it?” he said more as a comment than a question.

Tom had rolled the lightweight helo outside and had the power master switch on so all Bud needed to do was get the engine started and then take a quick look at the lights and make a visual check of the rotors. He got back in and started the overhead rotor spinning before engaging the tail fan.

Tom looked over at him as the small vibration could be felt in his seat. “Safe?”

“Pretty sure,” came back the answer.

Bud set the throttle to the proper speed for flight with two persons inside and pulled the collective stick up setting the pitch to give them lift.

“Well, it does seem to have ample power to get us off the ground,” Tom admitted as Bud swung the nose to the east for their two-minute flight over to Lake Carlopa.

“Yep. Lots of power from a nice and compact turbo-jet behind the back seats, but I am reporting back to them their load limits are off by about one hundred pounds. They say four people and then say based on a pilot and passenger weight average of one-eighty, but the total load I’ve been able to lift with is just six hundred-thirty. Okay, pick a spot for our hover test,” he

suggested pointing to the lake that was just coming underneath them.

“Why don’t we go sit off the old Swift property? It has the nice beach in case you need to set down quickly, and the water stays at six feet out to about ninety feet.”

“Yeah. I guess if we are going to take a bath, might as well be in the warmer, shallow water.” He brought them to the left and in a minute had them hovering over the Swift family’s original property. Still owned by the Swifts, it was now only used for occasional parties and as a tour spot for dignitaries who felt they needed to know how the original Tom Swift and his father Barton had lived and worked.

Sand whipped around from the beach until Bud side-slipped them out fifty feet or so.

“I’m going to hold her at fifteen feet for ten minutes before we go up to fifty for twenty more. Okay?”

“Sure. I can always sit here and read the owner’s manual.”

Bud shook his head. “Doesn’t have one. Not yet, at least. I had to figure out everything myself.” He shrugged. It was true, the manufacturer had not included a manual telling him they’d forgotten to have one written by their engineers.

So, Tom amused himself with studying the rather sparse instrument panel. All the mandatory ones were there—not where he might like to have them—and more grouped by size not function. There were no extras to be seen. Nothing to indicate cabin or outside temperature for instance. No heater controls and no outlets providing heat or even outside air to circulate inside.

When he asked about the latter, Bud reached over his own shoulder and slid a small Plexiglas panel forward opening a two-inch by three-inch rectangle to the outside.

“Don’t worry about heat, skipper, because in about two more minutes that turbine will be pumping out so much heat you’ll wish we had twenty of those vents.”

He was right. It soon got warm and then very warm and then outright hot inside the cabin.

Before he took them to the higher altitude to hover, Bud flew them around to flush out some of the hot air. It took three minutes and he told the inventor it would last slightly less than that.

“If it gets too hot, tell me and we’ll curtail the flight. I—”

A sudden jarring thump could be heard and felt throughout the helicopter. That was followed immediately by popping sounds coming from behind the young men to their right and left.

“Hank’s pontoons,” Bud had to yell over a screeching noise coming from above them. He was obviously wrestling with the controls but Tom knew it was a one-man show and kept his hands off the stick and his mouth shut letting Bud concentrate.

The helo was quickly dropping down, still under control—barely—and was only five feet over the water when the main rotor and the rest of the aircraft parted ways. All three blades shot toward the beach where they skipped once on the water before plowing in, tips first, in the sand, and the rest dropped into the shallow water.

As Tom shook his head and realized they were both fine he noticed Bud shaking his head.

“Hey, flyboy. Unless you took a good knock to the knees, we seem to be in mostly one piece. Those pontoons appear to have cushioned the drop.”

The flyer turned to face Tom who now could see a pretty bad cut over Bud’s right temple where it impacted the side door. He pulled his handkerchief out, folded it into a good square, and handed it to Bud. “Hold that over the cut until we get to shore and can get Doc or someone over here.”

Bud dutifully shut off all systems before they exited the helo and they had a good laugh as one of the pontoons deflated suddenly and the whole thing tipped over.

“Good thing the fuel tanks are sealed and use pressure to deliver to the turbine,” Bud said as he allowed Tom to help him wade to shore.

Tom tapped his TeleVoc pin under his shirt collar and was quickly “speaking” to Doc Simpson at Enterprises’ Infirmary.

His brief explanation seemed to be sufficient for the medico to get an ambulance on the way. “They will get there in five or six minutes, Tom. I’ll be waiting in case our Mr. Barclay needs a stitch or two.”

When the ambulance arrived, the young men had walked up from the beach and were sitting on the front porch of the house.

“Gee, Tom,” a pretty young woman said as she and an attendant walked over, “all the two of you need are tall glasses of iced tea, a shotgun leaning up against the porch and an old hound dog sitting on the grass.”

“Hey, Debbie. How’s our resident Physicians’ Assistant and some day doctor?”

She smiled even more brightly. She had been just sixteen when she had patched Tom up so expertly that Doc hired her on the spot, sponsored her through nursing school and now had her just finishing her PA schooling and diploma award a week earlier. She would do a year as a PA before heading to Medical School.

She walked up to Bud and took his chin in her hand, tilting his face so she could see the cut.

“Hmmm. Well, not too bad and I’m moderately sure Doc will let me do the skin glue thing and have you all pretty in no time. Does it hurt deeper than the skin?”

“No. What really hurts is my pride. I told the skipper I wasn’t going to endanger him with a little ride... and *pop, bang, splash*, we crashed!” he looked glum.

Debbie took him by the arm and eased him up, walked with him down the steps and got him on the gurney sitting at the back of the ambulance.

“Need a ride back, Tom?” she asked as she and the attendant strapped the flyer down and shoved the collapsible gurney into the back.

“I sure do. Want me in back with Bud or up front?”

“Take the front seat, Tom. I’ll be back here soothing Bud’s fevered brow and maybe jabbing him with a little Novocain to get him prepped for a little tugging and straightening.”

At Enterprises, Doc took a close look at the cut, agreed it could use a little aligning and sticking together and let Debbie go off with the flyer to do her magic.

“What happened, Tom?” he asked curiously.

Tom described the “accident” with the helicopter they were testing and the luck they had in being relatively near the water’s surface and the pontoons on the helo.

After scribbling a couple notes, the young medico looked back at Tom.

“Accident? For certain?”

Tom shrugged. “I’m not totally convinced which is why I am going to get Harlan Ames involved with his Security folks, and also get that helo back here to be torn apart.”

He made a series of TeleVoc calls on his way out of the Dispensary and over to the Administration building.



Harlan agreed it needed looking into. Hank Sterling agreed to head up the recovery, transport and tear-down to the point where Tom and perhaps an FAA team could discover what went wrong. Tom's father, Damon, agreed that it seemed more than a little suspicious.

When the younger inventor reached the office he and his father shared, Damon was sitting in the conference area looking over a report. "Take a seat, Tom I want to have you read this as well. It is a combination of Bud's notes and what Hank believes is wrong with the aircraft. I like *none* of it!"

When Tom was sitting in the chair next to his father he took the nine-page report and leaned back to read it.

Five minutes later he was sitting forward studying one particular page.

"That's one of the most ridiculous mistakes I've seen in any aircraft since the Wright Brothers," he declared.

"Which part, son? I spotted three."

"Oh. Well, as far as getting to page seven I'm seeing cast aluminum parts used for both the central rotor and the rear rotor. That's just plain dumb. Criminal, to be frank. Nobody would use cast aluminum for those high-stress parts unless they were trying to cause an—" He stopped as it hit him. With a small gulp, he continued, "Nobody in their right mind would use that unless they intended to cause everything to fly apart."

Damon sat there, fingers steepled under his nose, nodding.

"My thoughts, exactly. And, that brings up the big question. Did someone have it out for *you*... or was this an act of sabotage aimed at Bud?"



## CHAPTER 2 /

### BASHALLI MAKES A REQUEST

TOM HAD no response for that. Either way, if it was meant to hurt or kill someone at Enterprises, how would a reliable company like Whitcomb Aeronautics up in British Columbia think they might get away with it?

Located across the airfield from the passenger terminal at the Vancouver Island airport in Sidney, Whitcomb had been in business since the nineteen fifties and had created a series of small two- and three-passenger sport planes that, at one time, had been competitors to the Swift's own *Pigeon* and *Pigeon Special* planes. That had ceased when the owner, Abner Whitcomb died in a plane crash testing one of his latest designs in nineteen seventy-six. The company stopped all new designs, concentrated on repair parts and rebuilds of existing models and survived on a few government contracts.

Damon knew the feeling having taken over the older Swift Construction Company—or The Swift Company as it was known then—and pulled, tugged, pleaded and finally yanked the failing company out of the muck of bankruptcy.

Then, in the late nineteen eighties, and once Abner's nephew Robert had taken the reigns and started up the small production line, they once again went into aircraft production starting with an all-new *Whitcomb Starling*.

Enterprises had raised a protest that the use of a bird name was meant to confuse people between *Pigeons* and *Starlings*, but a Canadian court had seen differently, and the matter was dropped.

Everything was behind both companies and Enterprises even provided an avionics package with built-in radio for the Canadian company's planes.

Only a month earlier Robert Whitcomb called to tell Damon he was stepping down. A week later came a letter stating his son, Robert Junior, was taking over, and would Enterprises accept a request to fully test their latest forthcoming product, the *Whitcomb Dragonfly*, a four-place mini-helicopter with a range of nearly six hundred miles and a top speed of one hundred-sixty miles per hour.

“Certainly we will test that for you, Robert,” Damon had replied in a note of his own. “Sorry to hear you are heading out to

pasture, but I guess you know when the time is right.” He thought it a bit curious as he had never heard that Robert had a son but decided it wasn’t worth the worry, or even a question.

Now, sitting with Tom, he was thinking back to that very exchange of letters and the rather odd request accompanying it. “Tom, when I agreed to take on this helo test, Robert Whitcomb up in Canada asked that we not bother you with it, as he put it, but would love to have Bud give it the full range of tests. Now that I’m thinking about that, I am greatly bothered that someone wanted to hurt or kill your brother-in-law. Am I being foolish?”

Tom shook his head. “I’d say that sound suspicious at the very least, and ominous at the worst. Have you called Harlan, yet?”

“No,” the older inventor shook his head. “I was waiting to hear from you. Let’s call Canada first.”

Robert Whitcomb Jr. seemed uncomfortable with their call. He began by nearly barking, “What do you want?”

After Damon asked if his secretary had told him who was calling—she had—he asked if this were not a good time to discuss the helicopter.

“Other than running it through a few paces, what do you expect me to tell you to do?”

“Well, first, a small attitude adjustment might be nice. You see, we are doing these tests as a favor to your father. As in, for free. And, before you jump back down the line, let me just say we have found several inadequacies in design and manufacturing that has caused a crash. We—”

“You crashed our helicopter?” the Canadian practically screamed. “I’ll have our lawyers draw up a multi-million dollar lawsuit and we’ll just see about this.”

Damon looked at Tom and they both anticipated the line to be disconnected. When it wasn’t, Damon stated, “It looks as if lawsuits may cross paths in the mail, then. You see, we strongly believe we can prove that the design was purposely put together so that someone—our test pilot for example—would be seriously injured or even killed by faulty parts. Incidentally, only an absolute rank amateur would use cast aluminum for the rotor hub. Good bye!”

With that, he stabbed his finger down on the line button.

The two men sat looking at each other before Damon spoke again. “Do you believe they meant to harm you, son?”

Tom shook his head. “No, and here’s why. Robert senior knew

that I had no time to work with their aircraft and we would be assigning all, as in each and every, flight to one of our top test pilots.

The intercom buzzed. “You have a call back from Canada. I have been asked to convey an apology and a hope you will take the call.”

Pressing the button, the older Swift said, “Thanks, Trent. Line three I guess from the blinking light?”

“Yes.”

He pressed the indicated button. “Yes?”

“Uh, Mr. Swift. I don’t know how to apologize enough to you for my behavior. I’d love to be able to say my secretary gave me a wrong name, probably someone with whom we are having difficulties, but the truth is, she did not. I am, frankly, overwhelmed right now and took my frustrations out on you. Before you say anything, I want you to know the legal threat was a hollow one and would never have made it out of my office.”

“Okay, I will first tell you that I accept the apology and will put the previous call behind us. But, we did have a crash when the rotor hub of your *Dragonfly* shredded about an hour ago. It was over water and we have recovered the helo, which is mostly undamaged, and our engineers have begun going over everything. I have to tell you that my statement about the stupidity of speccking aluminum for a high-stress component on any aircraft or even an automobile, is nearly unforgivable.”

“The most important things is, did your pilot get hurt?”

“He is just finishing up getting a stitch or two in his head where he slammed it against the side window,” Tom said. “This, by the way, is Tom Swift.”

“Yeah. I recognize your voice,” Robert junior told him. “Ever since I was fourteen and heard your radio calls broadcast as you reached the Moon, I’ve heard that voice.”

Tom looked a bit stunned as he looked at his father. “Uhh, first, do we just call you Robert or Robert junior, and then if you were fourteen when I did that flight, you must be, what... twenty-one now?”

“That’s right. Twenty-one a month ago, pulled kicking and screaming into the family business because my father—and please don’t let this get around—but he’s had three heart attacks in the past year. I have to keep this place open at least until I can pay off his medical bills. But, that isn’t your problem. Oh, and I’d

prefer Bob.” He sounded defeated.

“Then I am Tom. So, Bob, what’s the story about the aluminum parts in the *Dragonfly*?”

There was a pause, then, “I don’t know. I do, however agree that if it was the rotor hub that broke apart, it should never have been machined or cast from aluminum. I’ve got to go talk to some people about this.

He asked that Tom send directly to him the list of substandard components and again offered to cover any and all medical costs for the test pilot’s injuries.

After hanging up, Tom called Bud to ask for the definitive list of things the pilot had discovered.

“Have it over to you in ten minutes, skipper. I’ll drop it by myself because there are a few things I want your feedback on.”

When he arrived with a four-page list Tom was surprised to see a few things he’d never have considered.

“One thing I don’t see here, flyboy is the ventilation problem. You forget it?”

Bud shook his head. “No. I asked Hank to come over the other day, before our little swim, and see what he thought. His engineer insight said they would have problems with putting any other sort of vents in the windows or doors because of the non-continuous curvature. Ditto up front or even under the floor where there is no room to cut through that won’t mean rerouting a lot of wiring, piping, or even frame components. Think I ought to mention that anyway?”

Tom said he did. “Here’s why and how I’d do it. Make one extra page and mark it as ‘Occupant Comforts’ or something like that. Perhaps add words to the effect that you realize they might be nightmares to engineer in now, but ought to be considered for any future update... or if this is a prototype and it isn’t too late, they would go a long way to making the helo enjoyable to fly. Stress the cabin heat issue.”

Bud sat down at Tom’s desk and called up his original files. He added a few new things and made the additional page.

“I added the auto-fill capability to the pontoons as a safety measure and described what they did to save you and me.”

Tom suggested he send it to the email address of the company manager and a minute later it was on its way. “Send all your reports to dad as well, please.”

Before he left, But turned to his friend. "I hear from my fair-haired wife that you and Bash are coming to dinner this evening. Any idea what the two of them have on their minds?"

This was news to Tom and he admitted he could think of nothing other than the notion of a vacation.

"Just the same, we need to be aware they'll spring something on us," Bud said with a smile. "This sort of non-negotiable invitation usually ends up that way."

When he arrived home that late afternoon Bashalli threw herself into Tom's arms and practically smothered him with kisses. But, being now just a day shy of six weeks from her delivery date, her energy waned quickly and Tom eased her down to the floor and over to the couch.

"I don't mind the display at all," he told her gently, "but are you certain that at this stage you should be exerting yourself so much just in kissing me?"

"Now and always!" she assured him and gave him another kiss to make sure he realized she was serious.

"So," he said finally leaning back out of her grasp, "what's this about dinner with Bud and Sandy tonight? You never said a thing to me about it."

She looked suddenly sad. "You aren't angry with me, are you? I sort of forgot about it until this afternoon when she called to ask if we could pick up some bleu cheese and mayonnaise for salad dressing. I had to tell her that right now any creamy dressing makes my tummy do flip-flops, so we're having a raspberry vinaigrette. Hope that is okay with you?"

He assured her it was fine. He liked raspberries.

"What's on the agenda?" he asked.

Bashalli feigned innocence as she shrugged. "I don't know what you are talking about, Tom. This is just a nice, quiet dinner between friends."

"Is that what Sandy told you to say?"

She nodded and looked guilty.

"It really will be nice to have dinner with them, you know," she said. "It's been more than a month, but there is a little something I need to ask you about, and she wants to have Bud on board with it as well. I won't tell you what that is, yet, but it isn't a bad thing. Believe me, please?"

He pulled her over to him and she eased into his lap where

they sat, rocking slightly, for another five minutes before his legs started to feel a little numb.

They got up, went upstairs to get dressed and left ten minutes early so they could drop Bart off with Anne Swift who had “gramma duty” that evening.

While she and Sandy made the salad dressing, Bud and Tom stood out under the awning on the back deck barbecuing steaks and corn on the cob. The weather wasn’t exactly conducive to standing out at a grill, but it was not wet, and they all agreed that it sounded good.

Especially to Bashalli, and it was for her comfort they were catering to her food desires.

At the table the conversation covered a variety of subjects including the recent demise of the Electricity Vampires and their invisible airship. They agreed with Tom that it would have been nice to see how they managed everything but the ship had crashed and a bomb inside—likely meant to be dropped on the Swift’s nuclear facility in New Mexico, the Citadel—made certain everything was totally destroyed.

Only fire might have made it more difficult to discover anything.

By the time dessert was being prepared by Sandy, Tom turned to Bashalli and gave her a look that said, “When do we find out what is going on?” She smiled sweetly back at him and said nothing.

The dessert, a store-bought cherry pie with vanilla ice cream that Sandy had made using a new ice cream machine Bud bought her for her last birthday, came out and everyone looked at theirs in anticipation.

Bud pushed his away and looked at his wife.

“Tell us.”

Sandy tried to look like she had no idea what he was talking about, but Bashalli politely coughed and all eyes went to her.

“What Sandy and I want to say is not Earth shattering, but it is important, especially to me and,” she glanced down at her bulging midsection, “to the new baby.” She gulped, realized her mouth had suddenly gone very dry, and took a sip of water. “So, with two children now in our house, and some day one or more in this one, I... we... want to ask the two of you to please stop getting into dangerous situations.”

Tom looked at her. It was true that over the nearly eight years



they had been together, he and Bud had more than their fair share of incidents where one or both were clobbered, kidnapped, attacked, shot, sucked into the vacuum of space, and even stabbed. Both came through with the help of Doctor Greg Simpson at Enterprises and a team of exceptional physicians at Shopton General Hospital.

It *was* a miracle, but brain scans of Tom's head—the one to take the most abuse and therefore have the most concussions—indicated that it was in fine condition with no long-lasting effects and not at all looking like that of a professional athlete who might have troubles later in life.

Tom rubbed his jaw and lower face. He wasn't certain what to tell her, but he knew she longed for him to be safe. Sandy, too, for that matter. She was his sister and loved him, and so she had both his and Bud's welfare deep in her mind.

She spoke up, breaking the silence. "We both are realists and know you two will never give up the adventures, at least for a few more years—heck, even Daddy gave them up mostly once Tom and I came along—but we don't want you to go so willingly into unknown situations like black holes, wormholes and even rabbit holes!"

Tom smiled. "You do recall dad gave up the adventurous life not because of you or me. It was because of all the time it took getting the Swift Company back on its feet, getting Enterprises built, and everything else that has gone on since you were five and I was six."

Sandy Swift-Barclay really didn't like it when logic was used to defeat one of her carefully formed arguments, but even she had to nod her head.

"Yeah, but mother really appreciated him being around all the time. I just think Bashi deserves that as well. You owe it to Bashi to stay home!"

Tom looked at his wife. "Do you resent my going out into space or under the ocean? I understand the dangerous stuff, and believe me, I don't go looking for it, but the other things?"

Bashalli, whether from the pregnancy or being tired or just other emotions, broke down and started to cry. She looked straight into his face, not covering hers, and shook her head,

"Way to go, Sandy," Bud told his wife. Now, she teared up and soon she was hugging Bashalli and asking to be forgiven for ever prompting her sister-in-law to help her corral Bud.

"Ah," stated Tom once that revelation had come forward.

“Listen, Bash, and you, too, San. Other than the new ParaExplorer flying rig I’m building for Haz and the folks on Mars, I really have nothing else to tackle right now. Let me get that finished and then I’ll try to spend the next six months right here in Shopton. I probably owe dad at least that much time finalizing all the notes and such on the last six or seven projects.”

Bashalli sniffled one final time and dried her eyes on a tissue handed to her by Sandy.

“Para-what?”

Tom reached over to the back of a nearby chair and took his tablet computer from the pouch he carried it in. After turning things on he located a file and turned the thing around so the others could see it.

Looking a lot like a giant two-tiered parawing parachute with a gondola slung underneath, he explained that it was a flying machine that could carry a team of three people up to six thousand miles.

Currently that’s just under half way around Mars, but Haz has an idea to get supplies out to things a third of the way around in two directions, so all it needs to do is get about forty-four hundred miles to the first stop, refill all supplies, then go to the next, and finally arrive back at the base in just over seven days.”

He explained the basic rig would fly in the Martian atmosphere up an altitude of about seven thousand feet and be capable of speeds up to eighty miles per hour.

“The top of the sail is all made from materials our own Solar Materials department are making for me and will be optimized for the light waves coming through the air up there and at the distance from the sun they are.”

“Why?” Bashalli asked. “I mean why make that?”

“Well, Haz wants to make a survey of the planet at a low altitude that has never before been accomplished. I don’t know if you remember it, but about a dozen years ago a probe was sent up with a folded ultralight airplane drone that parachuted down to about five thousand feet before unfolding, revving up its electric motors and dropping free of the main chute.”

Only Bud had been interested enough is space at that time to recall the basic probe.

“Didn’t it get off to a bad start?” he asked.

“Yeah. It dropped free and inverted almost immediately. It was only by sheer luck that the programmers had thought about

that possibility so they sent a ‘flip’ code up that got there about the time the probe was fifty feet above the surface. It responded by believing up was down and right was left and managed to get back to a couple thousand feet, but it then caught a bad gust of wind and spiraled into the ground below.”

“They never tried that again, did they?” Bud inquired.

“No, and mostly because they just couldn’t get the ratio of weight to lift to power figured out. And, according to dad and my calculations, they never would as long as they insisted on trying to make it look and fly like an airplane.”

“But, yours,” Sandy said looking at the paraglider form, “is meant to bring something down, not hold it up.” She knew aircraft and was certain she’d spotted a problem.

“If it were a single tier, you would be mostly correct, San. However, the second tier acts like a lifting wing almost exclusively and the pair of them mated with a strong electric ducted fan that pushes the gondola underneath forward will hold up as much as five hundred pounds of people and cargo. I’m adding landing skids so if they need or want to touch down all they do is land, lightly and slowly and then get out.”

Sandy was shaking her head vigorously. “No, Tomonomo. That canopy comes right down on them and it’s all over. No take-off after that!”

“Except for the secret,” Tom teased causing Sandy to make an impatient huffing sound. “Those two parawings are hollow and filled with helium from our own wells. They remain aloft ready to fill with even the light air up there and get them back off the ground after a fifty-foot roll.”

Bashalli’s mouth was all scrunched to one side as she thought things over.

“What’s on your mind, Bash?” Tom asked.

“I was thinking I might want to reword my request. If, and I mean if, you have to go up to test that thing, I want you to promise to wait until after I give birth to our daughter, get her through her first month of me feeding her, and then I’d like to go with you and take Bart along to show him what wonders his daddy and uncle Bud and aunt Sandy have done on a distant planet.”

Tom smiled. “I might not need to go, you know. Haz’s people are quite competent.”

She nodded. “Yes, I know, but if you do want to go, let me

have a couple weeks of storing some milk for the baby and we can be gone for, hmmm, two weeks. Okay?”

“How can I refuse an offer like that?” he said, grinning.

## CHAPTER 3 /

### YOU MIGHT BE A WINNER

IT CAME as little surprise to both Tom and his father, Damon, when a brand new *X-Prize* contest was announced a few days later. In the past, both had entered more than once beginning with Damon's large cargo rocket, the *CosmoSoar*, and Tom's own *Star Spear*, the first all privately funded passenger rocket to successfully orbit the Earth.

Other contests, some relatively easy and so they were passed on in order to give others a fair chance, and some truly difficult enough to get their attention. The latter were cherished as "side projects" as they generally were also good test beds for future technologies that could benefit Enterprises.

The new Director of the Diamandis X-Prize committee was an attractive—if only a little startled-looking—woman; she permanently had the wide-eyed stare of someone finding themselves standing in front of a fast-moving train and having only just discovered her oncoming peril.

Sandy Swift-Barclay told them both the woman—Rebecca Speers—had obviously had some sort of "work" done on her face that had probably not been performed by one of the leading plastic surgeons, but rather one of the type who advertise their cut-rate services on late night television.

"I've seen her address a Women in Aerospace meeting and she has problems speaking in complete sentences," Sandy said just as the televised presentation was beginning.

"It is with great anticipation of a contest so challenging that only the best of the best will try, and only the top one or two concerns will even get off the ground." She gave a little unconvincing chuckle to emphasize her little pun.

"So, without further adieu I give you the contest. Without Government or assistance from any publicly-traded commercial company, we want someone—more than one if we can get it!—of you to build and race a solar aircraft. Wait. That's been done, Rebecca." She seemed to be talking to herself. "Many times. Well, here's the kicker. The solar-powered aircraft must be capable of around-the-world travel. It must start from a registered airfield, circumnavigate the Earth at a latitude of no greater than thirty degrees either north or south of the equator. Further, the aircraft must remain aloft until it completes a full orbit of the planet below. It may fly as high as you like so long as

you remain under fifty thousand feet altitude as computed beginning at sea level, and it may fly as low as you wish down to eight thousand feet but may not touch anything based on the ground no matter the altitude. The same goes for in-air resupplying. Not within the rules. Everything you need must be carried at take-off.”

She looked into the camera almost as if trying to decide if she ought to mention the next thing.

“Crews may be two or three persons, each at least twenty-one years of age, and citizens of the country from which they start and end their journey, and be a registered pilot with at least five hundred hours in their logbook. There is just one more thing, as a famous television detective used to say. The total time of the trip may not exceed thirty-six hours!”

She let the impact of that limit sink in before she gave a few more facts and rules after which her face was replaced by a screen with contact information to order an entry kit.

Thirty-seconds later her voice came back and she thanked the people on her team, hoped a number of people or groups would enter and thanked everyone for watching.

Tom looked at his father.

“Interesting,” they chorused and then laughed.

Sandy got up and started to leave. “I’ll order the kit for you two. Don’t fight over who gets to do it ‘cause we all know it’ll be Tomonomo and not you, Daddy, as much as you probably want to.”

She opened the door and, with her ever-present ponytail swinging from side to side, left the office.

“Your mother told me we ought to think about adoption a dozen years ago, but she got so big so quickly that we didn’t think anyone would want her.” They chuckled but Damon gave Tom a “Never repeat that” look.

“So,” he continued, “what do you think? Feel like giving the impossible a try?”

Tom shrugged. “Unless my math is off or there is some terrible head wind to be found, I believe we are talking about five hundred and some miles per hour. On solar power no less. Before I make any decision I need to check what limits they have on batteries, because if they think anyone will be chasing the sun as it slips over the horizon trying to keep their solar cells in the light, they will never be able to fly fast enough; people are going

to have to carry some of their own power.”

Bud knocked and came into the office.

“Doc cleared me. Nothing shook loose up there and Debbie got the bleeding stopped and the skin stuck together really well. Now, if I can only keep any new injury away from Sandy for a month or so, or convince her I got this one while I was dueling for her honor, I may not have to tell her about any more little boo-boos.”

“Or another *oopsy* as well,” Mr. Swift told him.

“Yeah,” the flier said with a small grin, “that as well.”

The three men sat down and—at Damon's request—Bud went over everything he had discovered about the helicopter during the week it had been at Enterprises.

“I spent the first day going over all the controls. Did Tom tell you they didn't give us an owner's manual?” Seeing the nod, he went on. “So, day one was just familiarizing myself with everything. Day two was turn it on and see how it fared sitting on the tarmac. I started making a lot of notes hoping like heck this was just an early prototype because things like having just about zero ventilation meant that sitting in the fifty-two degree weather outside with the turbine spinning at the back got the cabin up to nearly ninety-eight in about five minutes. Tom can vouch for that.”

The younger inventor nodded. “Proverbial oven scenario until Bud showed me the tiny slide-back vents. They really weren't of much help.”

“So,” Bud continued, “the deficiencies and questions were mounting. By day three when I took it up in the air I had more than fifty notes or outright complaints.”

“How did it fly?” Damon asked.

“Well, pretty good, with just me inside. I now see that I was lucky I only kept it to ten feet above the ground that first day. I detected a vibration in the back and spent half the day hunting that down. Turned out to be the drive shaft to the back rotor.”

He described the cast aluminum part that had seemed a bit on the thin side to his practiced eye.

“I got out one of Tom's little aircraft scopes and went over it from front to back and it showed absolutely no cracks or pits or anything. I took it out and ran it over to the Construction Company and they put it on their balancer. Perfect. They got no vibrations up to about six hundred RPM, about eighty percent of

what it runs at in use. Above that..." Bud shrugged and looked at the other two.

"Bad enough to shake apart," Mr. Swift asked.

"I don't know. What the guys over there did was slide on a Durastress sleeve to beef it up. Still had a little vibration, but it wasn't going to snap on me."

His tests had continued through the next day when he decided to take a magnifying glass and look at everything. He had spotted the rear rotor hub and it being made from cast aluminum, and had run a few anemometer tests on the output of that set of short blades. "I made a note to tell them they were deficient in output, but I guess I never thought about it being some sort of plot to injure me. And, don't tell me that hasn't gone through both of your minds."

Tom and Damon had to admit it had.

"I don't know anybody out there who actively hates me and doubt if my prowess as a test pilot puts me in the crosshairs of anybody's plans for revenge or whatever," he said.

When Sandy breezed into the big office, waving a large, official-looking envelope clutched in her right hand, she was surprised to only find her father there.

"Hi, Daddy!" she said as she crossed to give him a hug. "No Tom?"

"No, he's helping Bud package everything from that little helicopter up to ship back out to British Columbia. He did say he'd be back for lunch, and that is—" he glanced at his watch, "—in about twenty minutes. If you can hang around we can all take a look at what you have there; I have a hunch what it is."

"No peeking, but you are right, and, since Harlan and his people already slit the thing open, and it happened to fall out as I picked it up—"

"You naturally had to look at it."

She had the decency to blush a little. "Naturally! Umm, not to change the subject, but what's for lunch?"

"And here I thought *you* married the chow hound. According to our very own executive chef, a Mr. Charles Winkler in case you haven't met, the offering is what he calls cluck 'n duck. I take it from the brief description it is chicken breasts pounded out flat, then a duck breast given the same treatment, and finally a couple



strips of chicken thigh meat around everything. With, I'm guessing, some sort of juice and butter reduction. I hope that drool I see forming is because you think it sounds delectable and not because you've had a stroke!"

She giggled. "No, just very hungry. I had an early teleconference with some folks down in New Zealand who want to see if we'll let them open a retail operation down there for our entire current line of *Pigeons*."

The original Pigeon aircraft, a front-and-back two-seater had given way to a side-by-side version, the *Pigeon Special* and then a faster four-passenger version, the *Racing Pigeon* and then the *Pigeon Commander*, a sleek twin-engine model. All had been incredible sellers with the first two relegated to history and no longer manufactured.

"Look like a good deal?" he asked her already knowing the details but preferring to let his daughter tell him all she knew.

"Everything except to their exchange rate. They want to lock in prices for three years and I happen to have done a little research and found that their government may be ready to do something that will bring the rate down, but not in our favor. So, negotiations will go on, with no paperwork to sign for weeks or months."

The door to the office opened and Tom and Bud came in.

"Hey, San," the young inventor called out while his companion marched over, picked his wife up and twirled her around. After getting and giving a kiss, she let him set her back down.

"Hey, back at you, brother dear. I hope after you let my Bud get hurt in that flimsy excuse for an egg beater that you did the majority of the lifting." She sniffled as if she somehow believed Bud's little cut had been a major inconvenience to her.

"No. He insists on reliving his days on the gridiron and telling me of his great and manly feats of strength so I sat back and let him do all the lifting while I checked things off on a clipboard." When her eyes narrowed and he could tell she was about to say something, he added, "And, he only passed out twice, so I have to say he handled things well."

"Daddy! Make Tom tell me the truth!" she insisted.

Damon Swift shook his head. "Not since you both got out of your teens do I get involved in these things. All I have to say is if you are going to stay here for lunch, I need to call Chow, pronto, to get you a serving." He picked up the phone and was soon

chuckling at something the western chef said to him. He slightly covered the mouthpiece and softly stated, “Sure. Go ahead... it’ll serve her right.”

When she practically stamped over to ask him what that was about he dialed another number and held up a finger to stop her.

Lunch went very well with Sandy more and more confused over what her father might have said to the chef. It wasn’t until after dessert she demanded to know.

“Oh, that? Chow asked me if, since you were going to be here, I wanted to switch from blackberry cobbler to the peach tart we all just enjoyed. I thought you’d like that better.”

Sandy had been slowly building up to being slightly cross, but this new revelation deflated her so all she could do was thank him. She stuck around while the boys told Mr. Swift two additional things they had discovered about the Canadian helicopter as they were taking off parts to pack it all up.

“They may be using locking bolt and nut combinations, but specifications call for safety cotter-style pins on anything over three-sixteenths of an inch. Nowhere in any of the frame or body or drive system is there even a hole drilled through a bolt to accept a pin,” Bud said with a shake of his head.

“Flyboy says nothing loosened up during the week we’ve had the thing, but I just can’t believe they would be so lax or disdainful of regulations. The FAA demands them and so does their own Transportation Safety Board.”

Damon looked at his children and had to remind himself they were both in their mid-twenties. It would do little good—and had generally been like this—to lecturer them so he posed a few questions and let them figure things out for themselves.

“Why would any company risk their own or some other test pilot by not following the rules?” he asked.

Sandy’s eyes teared up as she asked, “Do you think they were trying to hurt or kill my Bud?”

He put a fatherly arm around her shoulder and told her, “No. At least not him specifically. They could not have known which of our test pilots, or even if all of them might be assigned to fly that helicopter. No, I rather believe someone at their company is out to ruin their business and doesn’t care if someone dies to do the damage.”

Bud stated that he doubted anyone could be that callous.

Sandy had to leave shortly after Bud did but Tom stayed in the

office. Back at his desk he called up the ParaExplorer and was putting a few finishing touches on the gondola when his father wandered over to take a look.

“Impressive. Can you give me the fifty-cent tour of that, or do I need to pay for the full priced one?”

Tom grinned. “For you, the full tour at senior citizen discount which, today, makes it absolutely free! Pull around that other chair and I’ll walk you through it.”

With Damon seated, Tom described the dual level paraglider wing set-up. What he had not done when telling Bud, Sandy and Bashalli about it at dinner a week back was he was going to make the entire set of lines retractable by mounting them onto small, powered reels.

“I think I see the reasoning, but tell me yours,” his father prompted.

“Control. In light and no winds it is just fine to have the canopy high up, but in stronger winds it can catch too much air and become a danger. By reeling the lines in so the canopy is just about four feet above them the gondola and crew can continue on in even a fifty- or sixty-miles per hour wind.”

“I see. What if it gets higher than that?”

Now, Tom smiled. “The gondola can ground itself, bore a pair of anchors into the soil and deflate the parasail before drawing it tight over the top. Once the wind is gone they re-inflate, raise the canopy and off they go.”

Damon chuckled. Leave it to Tom to have just about everything figured out. “I suppose that leaves power and propulsion. But I believe I see what may be a retractable ducted fan at the rear. Or, am I imagining things?”

“You’re not imagining anything, Dad. That ducted fan will scoot the entire thing along at up to eighty miles per hour and is powered by a new class of Solar Battery I’m having them send down from the *Space Queen*.

The *Space Queen* was the giant tubular space station that had all but replaced the older, smaller Outpost. Now home to over two hundred people and with room for more as needed, it had triple the capacity for manufacturing and charging the Swift’s Solar Battery range.

“New battery?”

“Yeah. I wanted something that can recharge itself even as far out as Mars, so I created a circular battery with twenty-four cells

surrounding a special light tunnel that has a solar focusing lens on the top. The sunlight hits the lens, is amplified by the totally reflective upper surface of the tube and then shoots down into the middle of the battery where it directly charges each cell. You see, that tunnel is made from a special hardened glass so every bit of light entering the top goes into the surrounding cells.”

“It seems as if that would have quite a few uses down here as well.”

They discussed the standard business side of manufacturing the batteries, and Damon was pleased to hear the “build one” cost was just three dollars more than their standard battery with the same capacity and power rating.

“And,” Tom continued, “the entire outside of the gondola is covered with our own solar materials that Jim and his ladies are finishing. It will have a ripple pattern running front to back to provide some stability to the gondola that might not be there if the surface were totally smooth.”

“So, and I do have to speak for both your lovely wife and your sister, that leaves the question of when you intend to desert your family and go up to test the thing.”

“Ahh, they ratted me out to you, huh?”

Damon nodded.

“Well, while I intend to fly it around here a little, and then let the test pilots have their goes at it, I was hoping to talk some older, experienced pilot who might also have the scientific knowledge to make some changes on the fly, into heading up to the colony and giving it the run-through.” He looked at his father.

Damon looked back at him and nodded ever so slightly.

“Did I walk right into that one?” he asked.

“More like herded into it by two very determined women, both of whom he loves. Oh, and Mom will be casually inquiring if there is some way for you to help keep me Earthbound for the next few months over dinner tonight. I hear she’s making your favorite, pot roast with red potatoes and pan fried asparagus. Eat hearty!”

“I suppose the answer is yes, I can and will take your wing thing up and test it. Uhh, I’d like to make the trip as quickly as possible, so what will I be traveling in?”

“The gondola and everything is packaged down to something just slightly too large for anything but the *Goliath* or the *Sutter*,

but *Goliath* is much faster. She'll get you there in five days. And, Jake at the Construction Company assures me all will be ready to go into testing in eleven days. Haz Samson and his folks have been told to expect delivery within the next three weeks, so I hope you can arrange to cover this for me."

Damon said he'd work with Trent to arrange his schedule accordingly.

Tom changed the subject.

"What are your thoughts about the X-Prize? I've toyed with an all-electric turbine engine before, but I'm not so sure it will get an aircraft suitable for this sort of journey traveling at the speed necessary to meet the deadline."

"How fast do you think it will push you along?"

Tom had to think a moment before he answered. "Maybe four hundred as it stands now. I can tinker with it if we want to try for this and hopefully get it to the five-twenty needed. The only thing missing is how to power this miracle of the air."

"Well, the woman did say solar power—"

"Which I know, but the current small model of the turbine I had Dianne Duquesne and her team build last year takes about three kilowatts an hour to run at the current speed. I foresee a full-size one taking twice that much, then you times that by at least two and suddenly we can't carry enough batteries to get us even across the Atlantic Ocean."

They sat in silence for several minutes, each trying to think of ways to lower power consumption on something that would need to be about as powerful as a regular jet turbine engine.

Damon had a thought. "Your QuietTurbine technology?"

Tom chuckled somewhat ruefully. "I thought about using that. But, the QuietTurbine is out. It's deemed to be an 'exotic technology' and is officially a no-no."



## CHAPTER 4 /

### PUSH HARDER, DARN YOU!

WITH LITTLE to do while waiting for the new gondola and parawing to be finished, Tom tried turning to the matter of the electric turbine. It ought to be a simple thing to get the turbine spinning at the necessary 48,000 rpm or greater speed and for thirty-six solid hours. All it took was more electricity than could be managed or carried or resupplied.

And, that was just for the one turbine.

He knew he would need two of them, one per wing, to not just give them the speed necessary, but to satisfy the safety margin to be allowed to overfly any body of water wider than one hundred-twenty-five miles. The oceans they would need to cross certainly extended well beyond that. At one time, you had to have at least three engines to be allowed to cross, but that had given way to more powerful and certainly more reliable turbines several decades earlier.

In fact, Tom and Bud had flown around the world in a single propeller all-electric airplane years earlier as he was perfecting his atomic power pods. It had required miles of paperwork to get the one-time engine exception. They had made it, with a lot of luck, but for this contest carrying such a power source was against the rules, even as emergency power.

For a morning he tinkered with using some sort of power amplifier to get more oomph from what he was certain he would have available. Using his revolutionary CoilCap, a capacitor shaped like a funnel around which power moved quickly and was ramped up with each orbit around the central cooling area, he found a way to stretch power out at least fifteen percent. That would mean getting from Shopton to about Ireland, but not much further.

He pondered the idea of using both turbines to get into the air, shutting one down in flight to conserve energy, and only bringing the other up during times when they could make the most electricity.

It was a dead end, though. He could find no practical way for a single turbine to keep up the necessary speed to make the circumnavigation within the contest time limit.

Tom walked over to Propulsion Engineering to have a talk with Dianne Duquesne. She knew some of the issues over the X-

Prize mandates but had little to offer him.

“We quickly get to the point where we can no longer tilt or twist the turbine blades any further before the added resistance works against us,” she reminded him. “Ditto trying to go with smaller, thinner and more blades. Pretty soon they start to impede the flow of the air. And, as you suspected, QuieTurbine technology is not going to work. It’s a pity you can’t just have a nice, single repelatron pushing back and down shoving you forward.”

Tom nodded and shrugged. “The X-Prize committee was pretty direct and to the point on that calling out *exotic technologies* including what they call ‘power rays,’ and ‘magnetic drives derived from trailing behind another aircraft.’ The first was directed as Enterprises and the other supposedly comes from a small company in Kansas that have developed a no-line tow system for gliders and other aircraft.”

She looked at him curiously. “Is that the one they claim will someday mean zero airplane crashes because someone will just pop up there and take a damaged or powerless plane in tow? I hope they are not trying to steal your Attractatron tech.”

“No, theirs uses a powerful electromagnet; strong enough to pull fillings according to dad. Not likely to happen but the organizers want none of that. So, knowing what we can’t use, what have you got for me?”

“I’ve had Artie trying to work with Hank Sterling on blade configurations and numbers, but they got very little extra speed or reduction in power draw. I’m not convinced that using the motors we have available is ever going to work. Too bad you can’t do this with a whole wing full of small turbines.” She chuckled. “I think there is a class of model aircraft electric engine used in place of a gas turbine in some jet models that can crank a small set of blades around at nearly eighty thousand rpm.”

Tom promised to help her look into what it might take to use something smaller and in greater numbers, but he wasn’t enthusiastic about the probability of success.

Bud, too, was totally at a loss to help his friend.

All he could suggest later that afternoon was that Tom look into coming up with a new type of electric motor.

“Such as?” the inventor asked perhaps a bit harshly, but he was feeling a lot of frustration at the moment.

“Well, I seem to recall an experiment you did back when we were, hmmm, seventeen? You took the premise of the rotary gas



engine and tried to see what it might take to build an electric version, remember?"

Tom nodded and his attitude softened. "Yes, I do. The problem was it would only turn at about a thousand rpm speed. Anything more and it wanted to seize up from the heat generated. Without the fuel in there to lubricate, it got really hot after only about two minutes."

"Well, forget that, then," Bud said.

"I did have an idea based on one of the things the ladies in England showed us when we went for the first visit. At least, Tommy showed it to me. I now seem to recall you and Betty were sitting in the office drinking sherry at that point."

Tom and Bud had visited the company and workshop of the two women during their search for a way to overcome the Electricity Vampires. As it turned out, Tommy Swift, a direct cousin previously unknown to the Shopton Swifts, and her best friend, Betty Rawlins, were in business turning out some incredible products.

So incredible that Damon Swift had invested heavily in their company making Swift Enterprises a 33% owner with each of the ladies having 33 1/2% stock ownership.

Tommy was tall, like Tom, and an inventive genius. She was so close to him in looks that people did double takes thinking them to be twins even though the family connection went back to Tom's grandfather, George and a fateful trip to England after his own wife passed away. The family tree completely diverged at that point.

Bud was now curious. "So, tell me what she showed you already."

"A new type of electrical generator that uses the same principles as a jet turbine, but in reverse and with tiny magnets at the tips of each blade rotating around and around with the continuous ring of wire coil in the outer cowling. She came up with a hub design that is about as near frictionless as I've ever seen. It takes a whisper of air to get the blades moving and the create a lot of electricity."

"Okay," the flyer started slowly, "so you can use that to make power, but what about shoving air back out?"

"Oh, but we don't use it to make power, Bud. We use a variation of it to spin by reversing the circuits and feeding power to the outer coils. That gets the blade set turning and before you know it you have a turbine engine!"

“Jetzt! So, how powerful will it be?”

“I don’t know. The one they’ve played around with is three feet in diameter making about four kilowatts in even a seven or so mile per hour breeze.”

Bud was about to ask if Tom could have two per wing: one making power and the other providing thrust, but he realized it was a losing proposition.

“Thinking about a dual turbine configuration?” Tom asked.

Bud blushed and admitted he had that thought but understood it was not a viable solution.

“You’re right, but it is something to think about for generating power in case of emergencies. I figure if we are at about thirty thousand feet and point the nose down ten degrees, we keep up speed for the twenty-six minutes and let the turbines just create power, then we go back into drive mode.”

“So, what’s the real constricting factor? Power used or what?”

Tom scratched a spot on his head before answering. “It comes down to push. The more push we get out of the eventual turbines the better, and that’s because if I can make these things so powerful then I can dial them back and find ways for them to run on less power. Dad and I talked about this the other morning and he believes starting with our power limits may hog tie the development.”

“I suppose it then starts to include things like how much weight we can take up and keep up.”

Tom nodded. “Right. Say, can you do me a favor?”

“Name it!”

“Follow up with Dianne in Propulsion tomorrow on something she mentioned. Small, incredibly fast electric motors for hobby flyers. Those have to be about as efficient with power draw as possible or else the flight times will be minimal.”

Bud promised to do that the next morning and headed off to ferry over the latest half dozen SE-11 LH jets from the construction Company. This Long Haul version was about four percent slower than the best performing model but carried extra fuel enough to fly from many East Coast airports and as far as England or Scotland, or from Los Angeles or San Francisco out to Hawaii, all routes with fuel to spare.

These were destined for delivery to one of the largest airlines in the U.S. who had recently started a small new company to

make runs between New Jersey and three UK airports plus further runs out to Germany, Italy and even Russia.

Tom returned to some research he had been doing on and off the past five days into zero- or low-drag coatings for aircraft. He had his negative-to-positive-to-negative electrostatic ion methods for such things as his transcontinental bullet trains, but that required electricity. It was great in that it held everything off the surface by a millimeter and meant nothing could stick to the surfaces causing drag. Even rain hitting at high speeds shed immediately.

For this application he needed something lightweight that could be applied as a thin film or even a spray. He wasn't even sure if it was worth the bother.

The phone rang next to his monitor and he absently reached over to pick it up.

"Hello? Tom Swift here," he said.

"Hello back to you, cousin Tom," came a smooth British female voice. It got his attention.

"Tommy!" he said into the receiver, a smile coming to his face. "What brings on this pleasurable call?"

"Hmmm. Well, you see I have this strange object sitting on my desk, I think you Americans call it a *com-pu-ter*, and it displays things like words and pictures on it every now and again, and just last evening it received something from someone purporting to be you. Am I the recipient of a false email?"

Tom groaned. "No, that would be me, Tommy. Sorry that I spaced on that. Things have been a bit busy around here. So," he paused briefly, "what are your thoughts?"

"About our flying generator?"

"Flying?" Tom asked, surprised. "The last thing I saw was you were going to mast mount a few for testing. What's this about flying?"

Tommy's laughter was infectious and made him feel like laughing.

"That was last week, Tom. Now, Betty and I are working on a way to put up to four of them on a flying wing that can sustain flight at about two thousand feet as long as there is a seven knot wind hitting it. Want one of your very own?"

Tom was at a loss for words but he managed to get out, "I'm thinking a lot smaller than that, but still up in the air." He told

her about the X-Prize, and she said she knew about it but really had other things to do.

“I’m into making power, Tom, not consuming it. However, your electric jet sounds like a lot of fun, or what the Irish call ‘craic.’ Like in ‘They had a cracking good time.’ Or did you need to be there?”

“No, I understand the word, and it should be fun, but the turbines I want to use consume too much power at the flight speeds necessary to win the race. As it is, I’ve only been thinking about the minimum speed necessary and not going anywhere near to how much more I might need to win.”

They talked about Tommy and Betty’s small generators with Tommy admitting she’d never attempted something smaller than about a meter in width.

She agreed to do a special build that week of a one-foot model so Tom could test it.

“I have to warn, however,” she told him, “you need to be scrupulous in locking down the blades when not in use. We forgot that, went out to lunch one day and came back to a melted test stand. Seems our ventilation kicked on and the breeze turned the turbine that built up power that had nowhere to go... Zap!”

Tom could picture everything that happened and told her he would be ultra-cautious.

She said she would get back to him the following day, then hung up and turned to her friend.

“Betty? Can you come over here and help me figure out something for my cousin, Tom?”

The more petite woman came over to where Tommy was sitting on the corner of a desk. She took a seat and let the blonde give her the basics of the contest and Tom’s inquiry. In moments her mouth was agape and she was wide-eyed.

“But, we’ve never run anything that fast, Tommy! I mean, golly! We took that test turbine over to the airbase at Brize Norton and ran it in their wind tunnel, how high did we go?”

Tommy’s mouth scrunched to one side. “Just about fifty knots, Betts.”

“And, Tom wants to run it at ten times that? Is your cousin insane?”

“I’m not certain, but he seems to be rock steady in his thoughts. He is correct that our frictionless hub is as near reality

to that concept as possible and that means there is no reason why a turbine so suspended can't run fast. Gee, Betts, I told him we'd make a one-foot version to test for destruct speed."

In Shopton, Tom wasn't pinning his hopes on the success of using Tommy's generator as a turbine. It wasn't that he didn't trust her engineering, it was that he knew the limits of generators, and unless she had tackled—successfully—the issue with heat build-up and therefore reduction in effectiveness, it was going to be a non-starter.

It was the reason why generators typically turned in the hundreds of RPM instead of thousands. Some had to be geared up and some geared down, but it was generally accepted there was a sweet spot in the speed that gave maximum output with minimum everything else. Friction and heat were the two biggest robbers of efficiency. Then, there was transmission of the power that came out with variations that were not compatible with the final electrical systems and therefore had to be sent through some very heavy-duty transformers, rectifiers, and other power station systems to get to the point it could safely be sent "down the pipe," and into homes and businesses.

And, that didn't include the switch from direct current coming from the generators into alternating current to be used by customers.

Tom momentarily sat thinking how useless it had been to make that move. Thomas Edison had disagreed with Nicola Tesla over AC versus DC with AC eventually winning out.

For what? Especially when many, many things had to then use other devices to switch that power back to the DC type they actually used!

"If Tommy and Betty can come up with a generator that I can stick off the back of the plane," he told Bud at lunch that day, "then even if their technology won't give us any push, we can have some power coming in even at night."

"I still don't think I'm totally sold on why it can't be at the back of the turbine," the flyer stated around a mouthful of a corned beef sandwich.

"Well, you understand drag so let's put it in that term. If you have a turbine that needs to spin at forty thousand RPM, as long as it can just do its thing, you get that and the airflow associated with it. But, if you put a generator at the back, and believe me, those rob some of your RPMs by being a bit more than dead

weight. It's like pulling along something that weighs a pound going slightly uphill, and then someone comes along and drops another half pound of weight on it."

The flyer set the last of his sandwich back on the plate. "Ahhh. So it then takes power strength to continue at the same pace and that means if we put the generator in the same spinning package it will take away some of our thrust."

Tom smiled and patted his friend on the shoulder.

As they sat, now silent except for chewing sounds and Bud slurping the last of his iced tea out of the glass, the inventor was contemplating what might be done to maximize power from a small generator without it becoming a literal drag on the aircraft.

\* \* \* \* \*

A couple days later Tom received a phone call while he and Bud were having coffee in the shared office. He made various, "Mmmmm," and, "Uhh-huh," and "Ahhhh," sounds before agreeing to be over "in fifteen minutes."

"Bud, that was Dianne Duquesne and she is asking if I want to look at something they've been working on. So, want to come see the latest all-electric turbine they've built?"

The flyer jumped to his feet spilling his partially-drunk coffee on his shirt. With a goofy grin he nodded and said, "Sure, but will they allow me through their doors and into their nice, clean testing room?"

The inventor pointed to the wall behind the pair of desks. "The apartment has a variety of shirts and even clean pants. Go change and I'll clean up your little mess."

By the time they arrived at Propulsion Engineering a group of workers had gathered around one of the three test chambers and were watching as a young man, Artie Johnson, made the final hookups between a power generator and the odd-looking tube strapped down to the test bench.

Tom marveled at the sight of the turbine. Nearly three feet long with an opening at the front of just over thirteen inches and an exit of nine inches it featured a pair of "waists" near the middle.

"Those narrower points are interim compression areas and give the final output about fifteen percent more airflow," Dianne pointed out. When Bud pointed to an extra lump near the top center sticking up about five inches and running nearly nine inches front to back, she smiled.

“That is the electric motor and gearing, Bud. We discovered it has to be outside the basic tube or it takes up too much space and reduces the output. This also lets us put a slightly larger motor up there. In the final version it will be set to one side so it never sticks up through the wing.”

Artie came out and over to the three. “Ready. Hey, Tom and Bud. Wait till you see how the little howler runs.”

Tom looked curiously at Dianne who smiled in return. “It actually does sort of howl as it’s coming up to speed, and then it turns into a screamer.” Turning to her assistant she asked, “Are we ready to go?”

They were so everyone went to the tomasite window that would protect them should anything come apart and want to fly at them.

At her nod Artie flipped back a safety cut-out switch cover and pressed a red button. The soundproofing kept the noise to a minimum, but in seconds both young men understood Artie’s nickname for the turbine. What began as a low moan increased quickly to a howl and then a screech.

Tom turned to look at the output gauges. He was disappointed at what he was seeing as the final turbine speed was just under thirty thousand RPM and the output at the rear was only half what he knew was required to get an aircraft up to the necessary speed for the contest.

Over the escaping noise, Tom asked Dianne, “Is that the top speed and flow?”

She bit her lower lip telling him it was and they were still looking for ways to increase both.

“We keep chanting a mantra as we test it and make tweaks, Tom, ‘Push harder and harder and harder, darn you!’ It has worked a little but all our tests point to a friction issue we don’t have in regular turbines that get some lubrication from the aviation fuel, and also most things we do to up the power drains electricity like a thirsty football player.”

Tom made a “cut” signal and Artie pressed the power OFF switch. The turbine quickly slowed and the noise level dropped.

“Keep trying, gang, and let me know if you have any breakthroughs,” he requested as he and Bud headed for the door.





## CHAPTER 5 /

### PAPA, AGAIN

TOM HAD to set aside his designs for the X-Prize entry when Bashalli and their forthcoming daughter decided to not keep an eye on the calendar. A full two weeks early he was awakened by having Bashalli's hand smacking onto his hip at 3:03 A.M

“Tom? Get up. Tom! It's time. Oh my, it isn't supposed to be, but I think the baby wants to come see her daddy!”

In two seconds he went from full slumber to groggy but awake to full comprehension of the situation.

He tossed back the covers and pulled them from over his wife, assisting her to get into a sitting position before he took a tee-shirt from the dresser and put it on... backward!

When their son, Bart, was on the way they had packed a suitcase for mother with what a woman might think are essentials such as nightgown, hair brush and make-up. In fact, they had packed it three months early the first time and it had been unpacked and repacked at least five times before they raced from the house one late afternoon.

Leaving the suitcase behind in the front entryway.

“Where's the case?” he asked as he brought out a comfortable outfit for her from the closet. When she didn't answer, his first thought is she must have fallen asleep and this was just a false alarm, But, he turned to look at her and she was shaking with barely controlled laughter.

“With all the things we went through with Bart I figured to only pack about three or four days early.” She shrugged and they both laughed until she winced and held out a hand for him to take.

The labor pain went away and she stood up, with help, and finished dressing.

“Please just fold up what I was wearing and put it in a paper sack from the kitchen. I can have my mother or mother Swift come here and pick up what they will know I want later. I will be too busy for the next few hours to really care.”

Outside, Tom helped her turn so she could slip into their larger sedan, got her seatbelt buckled and ran around to climb in.

“Are we going to have trouble with the twelve minute drive?”

he asked.

Bashalli shook her head. “I don’t think so. And, this might be one of the false labors many women go through, but it feels like the real ones I had with Bart. So, drive, please and also hold my hand when you can. Oh, and tell me you love me even though I am swollen up like an elephant seal and probably ugly because I forgot to put on any make-up and—”

“Shush,” he gently commanded as they backed out from the driveway. “You are beautiful without make-up, and you know it. Besides, all you put on these days is a little stuff around your eyes and they are gorgeous all by themselves!”

It was true, Bashalli had been blessed with near perfect skin, and with her slightly darker complexion she always looked tanned and healthy.

Tom made a quick call to the hospital using his car’s link between his TeleVoc pin—he had remembered to attach it... it was sort of an automatic thing—and his cell phone.

“We’ll be expecting you and Mrs. Swift in ten minutes, then,” the receptionist told him. “Please drive right up to the main entry and come inside. Unless you believe she needs a wheelchair at the car, we’ll have one just inside the door waiting for her.”

It required about twenty minutes to get her checked in and wheeled to a private room. There, three nurses swarmed over her, hooking her up to several machines that whirred, pinged and periodically beeped.

“Well, Mrs. and Mr. Swift, her blood pressure is looking great, oxygen level is pretty good and we’ll give you a little extra in a minute or two, and both your heart rate and the baby’s are rock steady and strong. We’re going to take a little blood sample to check your glucose level and iron level. If you are a little low we’ll give you an injection.”

She paused and looked at Bashalli. “I remember when you came in nearly four years ago and had your little boy. You were beautiful then and even more so now. After this is over I’m going to perch in the end of your bed and insist you tell me your beauty secrets!” They both laughed, and it had the intended affect of making Bashalli relax.

When the doctor came in ten minutes later and made all the normal medical checks he told her she probably had two hours to wait. “Perhaps three, but as you indicated, this does look like the real thing. That’s good because I sent a woman home yesterday for the eleventh time in two weeks. She’s very young and in a

panic over her baby and has been eating a lot of junk food. I keep telling her it's more indigestion than baby, but in she rushes twenty-four hours later." He patted her right hand. "You rest for now. If you are hungry I'll put in an order for some toast and a scrambled egg. Nothing heavier, I'm afraid in case we need to sedate you. Oh, and Nurse Baker will be back to outfit you with one of our more stylish cannulas to get oxygen up your nose."

She and Tom thanked him and Tom followed him into the hall.

"I have four calls to make, three to family, and wondered if you could tell me how long before I wake everyone up?"

The doctor consulted his tablet computer and looked back at Tom. "Well, it is just going on four A.M, and she appears to be at least one hour away, then she'll be in delivery and recovery at least two hours before anyone other than you can see her, so if you want, let everyone sleep another three hours. Tell them they can come down around nine after mother and child have had a little get to know you time and a nap."

As he turned to walk away, he paused and looked back at Tom. "Your wife, by the way, shows all the signs of this being a pretty straight forward birth. Her vitals and the baby's are what we call 'upper strong' so I'm anticipating a smooth morning. However, anything can happen so if anyone asks you to clear the room, please get out as quickly as possible saying nothing. Believe me, she knows you love her and will be 'just outside' and all of that. But, I only tell you that because I have to by law, not because I have any reason to think anything but the best."

Back in the room Bashalli squeezed Tom's hand and smiled at him. "Can I tell you something, Tom?" When he nodded she made a motion for his to come closer. When he did her arm reached up, looped behind his neck and she pulled him down to give him a long and loving kiss.

"You have been a wonderful father to Bart and I just know our Mary will be the apple of daddy's eye, even if I don't actually understand that saying, and you will love her and protect her like you do me and Bart. And, I feel guilty for what Sandy and I did at dinner before making you practically swear you would not go out on any adventures."

"Bash—" he started to protest but she placed an index finger against his lips.

"Your sense of adventure is one of the things, the *many* things, that attracted me to you. It still is." She stopped as she

seemed to be trying to make a decision about saying something else. “Okay, now I need to be honest with you. I know what you did back before Bart was born. The whole time travel thing.”

Tom felt all the color drain from his face. He hoped to never have to tell her about watching her die after being run down by a very evil woman, using his untested “Yesterday Machine” to travel back a full day and to put himself in a position to stop it from happening. The end result was, however, that one of the two Toms had disappeared in a gut-wrenching display of pain and anguish leaving just the one.

But, Bashalli had only been lightly brushed by the car and she gave birth just a couple days later.

In a whispered voice he told her, “I never wanted to burden you with that. How did you find out?”

She looked at him, tears brimming in her eyes. “I saw two Toms standing in that alleyway before the tires screeched and that woman ran into the power pole after knocking me down. When I finally looked back, there was just one of you. I don’t believe I want to know what happened to the other one, but I have believed since that day one or both of you saved my life.” She sniffled. “Did I die?”

Tom looked at the ceiling and then back down at his wife. “Truth? Well then, you and the baby died in the first version of that, well, not accident, *that’s* for certain. And, I did go back in time and get there with enough spare time to make certain she could not see where she was going and to disable one tire so the car would pull to the side, missing you. We both know it didn’t completely work out, but you and Bart survived even if one Tom had to perish.”

They remained on the bed for the better part of an hour, just hugging and assuring each other they truly loved the other one.

Finally, a cough from the door told them one or more medical professional was there.

It was the doctor and he made the same checks to see how far along Bashalli was.

“Okay,” he said making a note on his tablet, “in fifteen minutes we wheel mom-to-be down the hall to the delivery room and prep her. You,” he pointed to Tom, “make your phone calls—try to keep the entire thing down to under five minutes—before we have you scrub and then gown you after which we all get together and bring a baby into the world.”

Bashalli winced again as the nurse came to take her away. A

half hour later, Tom and Bashalli had their second baby, Mary Farah Swift.

Haz Samson, a giant of a man and leader of the Mars Colony, came out to the landing area in a lightweight suit with a small oxygen tank and a face mask. For many up here, a couple years had acclimated them so more than half could even be outside for up to several minutes with nothing more than warm clothing and a CO<sub>2</sub> trapping filter mask.

Of course, nobody did go out without either an air tank or an O<sub>2</sub> concentrator pack. These belt-mounted units were similar to ones used on Earth by people who required supplemental oxygen, and could draw enough from the CO<sub>2</sub>-heavy air of Mars to support a person's life for several hours if need be.

“Really good to see you, Damon,” he said shaking the older man's hand. “We get to see Tom and Bud and even their ladies once or twice a year, but I can't think of the last time you came up. And, I hear you've arrived with a little gift for us.” He winked through the clear faceplate of his air mask. “Come on. Let's get you inside and out of that bulky suit. We'll have lunch and you can fill a bunch of us in on this flying machine Tom's come up with.”

Over a meal that Damon would have been willing to swear had chunks of chicken and vegetables in a delightful cream sauce—but he knew would be made from those vegetables and a soybean product they manufactured themselves to look, mouth feel and taste like beef, pork, chicken and even a soft version approximating fish—he described the air vehicle that was being unloaded by a team of the colonists.

They had, by unanimous vote years earlier, decided against calling themselves “Martians.” If there ever had been living, sentient beings on this arid planet, it would be a slap in their faces to assume the name.

“Wow. So, as fast as a tri-copter with at least triple the range? No, wait. Four times the range. That means you could get around the entire planet with just a couple stops. Incredible!”

Damon described the new type of Solar Battery and Haz was nearly speechless.

He lowered his voice and leaned across the table. “Damon. In all seriousness, if I could get a thousand of those up here, I could make the hydroponics areas operate nearly around the clock and perhaps double our output of oxygen and edibles, and also scrub at least thirty percent more CO<sub>2</sub> from our air.” He paused to let

that sink in. “And, we need it. Our two doctors agree that we are about as healthy as can be, but our blood oxygen levels have been falling, minutely mind you, since we got here. Anybody with a saturation of ninety-five to ninety-eight percent on Earth is now running at about eighty-seven percent.” He looked worried.

“So, do they believe that getting more oxygen into your air is the way to go?”

Haz chuckled. “They want us to set up hyperbaric chambers and force everyone to have a couple days of it being shoved into their bodies, but say it will only be temporary and that we need about four percent more pure O<sub>2</sub> in the habitat domes.”

Damon promised to have a word with Tom and also with the production manager up in the *Space Queen*.

“When do you want to take me out to see how this marvel of the air works?” the manager asked.

“Well, for safety sake I want to take the first flight solo, but it will only be about thirty minutes, I see no reason you and I can’t make flight number two right after that. We’ll probably be gone eighty or ninety minutes and will try to see how the thing maneuvers with a nearly full load.”

After explaining the weight issue and the three-man seating, Haz laughed. “Gosh. If that’s Earth weight I take up nearly three-fifths by myself. Well, you let me know when and where to meet you and I’ll be there. Uhh, does this thing seal up and provide atmosphere or do I need to come covered?”

“Shirt sleeves if we can find a way to get in before either of us freezes.”

Damon left to check on the status of the ParaExplorer. He suited back up in a light “colony suit,” departed through the front middle airlock, and walked the three hundred feet to where the gondola and wing were waiting. Nothing had been inflated yet.

Red Jones and Zimby Cox stood with Slim Davis, the three pilots that had come up to Mars with him. As he approached, Red stepped forward. “Damon. We all believe it isn’t necessary for you to take a chance up here. We’re happy as can be to run the tests if you want.”

Damon clasped him on his left shoulder.

“Red, and you other two, while I appreciate it I am not old, decrepit, aged, frail, infirm, feeble or even run down and tired.” He laughed seeing their faces. “I’ll be fine. Stand by the radio in case something makes a liar out of me, but while I appreciate your concern, I’m anxious to get my hands on the stick of that

thing. So, is she ready?”

They nodded. Damon could see they all looked tired and suggested an eight-hour rest break. “I mean that!”

He walked over and opened the small side door. Because Mars never would cause explosive decompression even if they sprang a leak, no air lock was necessary. He climbed in, sealed the door and ran his hand over the control panel. Like all Swift aircraft and most ground and submersible vehicles, all control gauges and readouts appeared on a single, wrap-around monitor. Often there was ample room for two sets so both the pilot and copilot could see—and arrange to suit themselves—all instruments.

However, in the gondola the panel was only six inches tall and stretched from the far left to the far right. Also, as this was not the final version, Tom had not yet set things up so instruments could be moved at will. This was going to mean he’d need to lean far to his right from the single pilot seat in order to see several of the gauges.

The panel came to life as his fingers touched the surface. He put the tip of his index finger against a special location to unlock the controls, and prepped for takeoff.

That was simple. One slider control filled the paraglider wings above him and they stretched the cables up until everything was taut.

Then he moved the drive slider up and heard the ducted fan being extended out of the back, followed by it spinning up.

With a thumbs up motion to the three other pilots he eased the throttle up a bit more and soon was moving forward. Seconds later the wheel/skids left the ground and he headed into the Martian sky.

Like any test pilot he began slowly and carefully working up to some maneuvers such as turns and even an in-place 360° spin before heading back.

While the technicians from the colony checked over the gondola and ran it through some self checks, he went inside to find Haz. As they reappeared together he was saying how there was an incredible sense of freedom.

“It has to be the lack of vibration from any overhead rotors. And, Tom has done a fantastic job of isolating the affects from the ducted fan arrangement. I think you will be amazed.”

And, he was. By the time they got back Haz managed to get his jaw back into place and the broad smile wiped from his face. Even though he had no real experience with piloting anything

other than his own former corporate jets, the man took to the control of the ParaExplorer like a seasoned pro.

Damon selected two men to head out with on the long distance test. The shorter two had been great successes with his speed coming back from the second one topping Tom's probable top speed by almost six miles per hour.

Now, he, Stanley Arden and Cody Phelps, two of the original fifty colonists and both qualified pilots back on Earth and of the tri-copters here on Mars, were heading for their farthest journey of the day. They would go out nearly four hundred miles before making a wide, sweeping turn to come back. It would not tax the power system much and would allow him to come back to Earth on schedule.

"This is incredible, Mr. Swift," Stanley commented and Cody eagerly added his enthusiastic nods.

"She feels like she's floating on air, even our pretty thin Martian stuff," the younger man stated.

Damon told them, "And, it is quieter than on Earth because of that very thinness of the atmosphere. Fortunately, there is enough to give us the lift we need. Stanley, can you give me a temperature reading on the motor back there? It's a readout to your lower right."

"One-ninety-eight, Mr. Swift. Right in the middle of the green zone."

They flew on in relative silence for an hour before Damon suggested he and Stanley swap positions.

"Let's give both of you a chance to pilot this. Once I leave tonight it'll be up to you two to be the main pilots and to train four or five others."

There wasn't a lot of extra room in the cockpit of the gondola, but the exchange was made in under a minute.

Damon decided to give each man at least two hours of time at the stick, so he sat back and answered their occasional questions. Fifteen minutes before they were due to swing around, he suggested another swap.

With Cody now in the pilot seat they began the sweeping turn to their left. It would take them nearly twenty miles to get turned around at full speed, as Tom had explained to his father. Quicker turns had to be done at relatively slow flying speeds, but the young inventor wanted some data on how everything performed at speed.



The turn was more than half-way complete when something shook the gondola violently. In seconds it was practically on its left side and they could all see the ground coming up to meet them.

Damon took a look at their overhead viewport and was dismayed to see the canopy was mostly deflated now, and several of their control and security lines had been ripped from the sides of the parawing.

“Cinch down and hold on tight,” he yelled at the two men seconds before there was a terrific impact and they all blacked out.



## CHAPTER 6 /

### A LITTLE DAY TRIP ON MARS

WHEN THE regular radio check time came and passed, Haz began to worry. It wasn't just that this was a mostly untried flying machine, but even a small glitch could strand his people and Damon out in the hostile environment that was untamed Mars.

“Keep trying to reach them and check on the emergency frequency. If they had to land and did it hard, that beacon ought to activate.” His radioman nodded and promised to try constantly to reach the team.

While that was being accomplished, Haz raced off to the environment suit locker at the far right airlock of Dome 1. He barely had shrugged into one his size and was adjusting the mask when the outer door popped open and he stepped outside. A minute later he was at a special, smaller dome that had never been connected by underground passageways as the other domes had. This is where the colony's tri-copters and other outside equipment was housed.

As he passed into the interior his hand shot out and slapped on a big, red button. Immediately, the lights dimmed, red rotating lights started to turn and a klaxon sounded. It jarred the five-man team who were stationed inside during this work period, but they came on the run.

A very quick explanation was sufficient for them to jump to action and the four tri-copters were readied and rolled to the large airlock to the outside. One by one they entered, were zipped in and the pressure lowered so the outer flap might be opened. By the time number four was outside, the first and second ones were spinning their three rotors and their pilots going through the pre-flight safety checks.

Haz had to smile to himself in spite of the seriousness of the situation. He didn't drill his people like a military outpost might, but they willingly practiced for just such an occasion.

Eleven minutes after he entered the storage dome, the four air vehicles rose, heading in four directions, about fifteen degrees from the next one.

With little more to do, he headed back to Dome 1 and the radio room.

There would be no sightings for several hours and so nothing

he could really do, but he sat and fidgeted over whether or not to call Earth and tell Tom his father's test vehicle had lost contact.

If he were to be honest with himself, and he generally was, he believed in the sturdiness of anything coming from Swift Enterprises. Unless they had been trying for some great altitude when... *whatever* happened, he believed the outcome would be positive, so he held off on sending any message that might cause panic where it was not necessary.

A dull, red light made itself known to Damon's eyes.

"Great," he muttered, "I'm bleeding into my own face." Then, it came to him where he was and he let out a small chuckle, albeit one that caused him some pain in his rib cage.

He didn't want to chance hurting himself any more by trying to turn and squirm around to check the others, so he satisfied himself by clearing his throat and asking if they were alive.

"Mmmmm," came a sound from behind him, so that would be Stanley. "I'm not saying I'm dead or alive, but if the pain in my ankles is any indication, either I've gone to the unhappy place and am being tortured from below, or I am alive and have a couple bad feet or ankles. How about you, Mr. Swift?"

"Ribs, I think. Cody?"

There was no immediate answer and both men allowed fear over his welfare nearly overtake them. But, he made a grumbling noise before speaking.

"Verrr sleepppyy. Hit ma head over on side. Concussion for certnnnn." He lapsed into silence.

Damon tested his fingers, wrists, elbows and shoulders. Both arms seemed to be in working order so he brought them up and prodded his upper body. "Yes!" he yelped as his fingers depressed the fifth and sixth ribs on his left side where he was injured. That was where the pain from even taking a deep breath came from so they had to be broken. He moved up and explored his collarbone. No damage. His face must have hit something as his right fingertips came away with a small amount of blood, but as he raised his arms and began checking his scalp, he noted there appeared to be no cranial damage.

"Cody? Cody! Wake up and talk to us." He reached down and over and patted the young man on his leg. When there was no response he slapped down, the noise like a rifle shot in the small cabin.

“What!” Cody moaned. “I said I didn’t want more boiled carrots, ma...” and then he seemed to snap out of whatever dream he’d been in and realized where he, and they, were. He let out a rather harsh curse and then apologized. “We crashed?”

Damon told him it appeared the parawing above them had taken a hit from something that not only tore the helium envelope open, it severed enough of the cables that the gondola had dropped to the left and was dangling there when they hit the surface.

Cody groaned. “My head hurts something awful, Mr. Swift, and I’m really tired. Can I take a little nap?”

Damon had only a smattering of first aid training but knew enough that he believed it would not be safe to allow the man to go to sleep; he might lapse into a coma.

“No, Cody. Hold on a few minutes while I try to get a radio call out. Stanley and I will keep you awake after that. And, in the mean time I will get myself moved around and check you out for broken bones. Stanley? How is your body feeling back there?”

“Well, I am pretty certain both my ankles are either broken or very badly sprained, so walking will not be on my agenda for a while. I whacked my left elbow when we hit pretty hard and it still stings, but it moves without giving me pain, so that should be okay. Other than that I’m getting thirsty.”

“Fine. Both of you just sit there and let me see what I might do about that call.”

The radio ended up being broken by the fall, or at least disconnected from its power source. A glance at the power pack readout told him there as electricity to be had, if only he could get the radio out of the dashboard in front of him. On the chance his son had thought to include a toolkit in the cockpit, he reached under his own seat and then under the pilot’s seat. With a smile he unclipped a small plastic case and brought it into his lap.

After explaining what he was going to try, Damon asked Stanley to talk to Cody and keep the young man awake.

Most electronic equipment in Swift vehicles were held in place by a special locking clasp, and it was the same one in each and every vehicle. After squirming around and then having to wait while the gondola suddenly slid down several feet and rolled back over into a nearly upright orientation—which made him realize how difficult it would have been to do anything with them on their side—he reached forward, ignoring the pain his ribs shot through his upper body, and unclipped the radio module. As he

had thought, the power cable was disconnected.

Tri-copter three was on the most direct course for the stricken ParaExplorer and its crew, even if the pilot did not realize it. He'd been flying at top speed for more than an hour when the first sounds came from the radio, the one tuned to the emergency frequency used on Mars.

"Damon Swift along with Cody and Stanley here. We have crashed on an approximate heading of one-one-five true from the colony. All have injuries with Cody sustaining a concussion. We were hit by something and lost lift. Gondola is tight and we are warm, but want to be rescued."

The tri-copter pilot smiled with relief as he thumbed the frequency over so he could answer them.

"TC-3 to Swift party. Have received your message. I am currently almost exactly on your previous course and making full speed. TC-2, if you copy change course for Mr. Swift's position. TC-1, you are way off course so return to base and get things ready for three injured. TC-4, meet at crash site as backup."

He continued to run the operation over the following three hours, which is what it required to get to the crashed vehicle.

"Mr. Swift? I'll be setting down to the rear of the gondola. I have to tell you I can't see a single reason you all managed to survive. The canopy is shreds of material and you hit about five feet from one of the sharpest small outcroppings of rocks I've seen up here. I'll be over with you in three minutes."

After landing and making certain his helicopter would be ready to take back off with the worst of the injured, he grabbed an emergency tent from under the second seat, popped the canopy, and climbed to the ground.

In a minute he was standing in front of the mostly upright gondola looking at Damon.

"I've got to cut away the rest of the lines before I get the tent around you, so hang on while I get some tools."

Twenty minutes later the emergency tent had been tossed up and over the gondola, sealed to the ground and inflated from a tank of breathable air. It would still be cold and like climbing outside at over fifteen thousand feet on Earth, but getting out and stretching a little felt incredibly good to the older inventor.

"Jim Ocean, sir," the man introduced himself as he eased himself inside through the small zipper-style airlock. "Two of our

other tri-copters will be here in about eleven and fifteen minutes, so let's see if I can get your crew out here."

With Damon's assistance—trying to ignore the pain—they got Cody out and settled on the ground propped up against the side of the gondola. Stanley was a more difficult task as he could place no weight on his feet. Fortunately, he was very strong and virtually pulled himself up and to the edge of the doorway. The other two eased him to the ground and Damon took a look at his ankles.

"Well, no bones poking out which is a good thing, so I'll grab the emergency kit and put a couple splits around those until we get you back to the domes."

Little Mary Swift was a beautiful baby who made it into the world quickly and caused her mother very little pain. After the traditional cleaning, weighing, footprinting and a few other things done to healthy babies, she was placed on Bashalli's chest, her little face just low enough for mother to look at her. Tom was glad to know a hospital camera was getting all this on a disc for them.

As Tom watched, Mary's tiny right hand reached up and touched her mother's chin. Her little mouth opened and a small yawn followed before the newborn fell asleep. He was about to step forward when he noticed Bashalli was dropping off.

With an inward sigh—he would get his opportunity to touch and hold their daughter a little later—he turned and tip-toed from the room.

The head nurse met him outside the door.

"Mr. Swift?"

"Tom, please."

"Okay, Tom," she said her voice softening, "I need to apologize to you. My associate was supposed to hand you your pretty little daughter before giving her to your wife. New hospital policy she forgot about and I was, as you may have noticed, out of the room. I'm sorry. We want the fathers to get that very early bonding experience as much as the mothers do. Is she asleep?"

Tom nodded and gave her a small smile. "They both dropped off in about ten seconds."

"Okay, why don't you give her about an hour and then we'll be taking the baby from her for a good rest in her own little crib."

Tom agreed to be back before then and headed for the

elevators.

He checked his watch and decided to run back to Enterprises to let his father know he was a grandpa, again. On the way out the door he remembered his own mother, mother and father-in-law, his two brothers-in-law and his sister were waiting down the hall for word. He detoured back into the hospital and went up to tell them.

“Tom. Why don’t you stay here, do that thing with your TeleVoc and then not need to rush about? I’m sure you’re tired,” his mother suggested.

He sat down suddenly realizing how right she was. “Thanks, Momsie,” he said taking her hand and looking up at her.

When Tom’s call was connected up through the nearly instantaneous link the aliens known as the Space Friends had provided to them, the radioman didn’t know what to do. In as calm a voice as possible he asked if Tom could wait a moment while Haz Samson could come on the line for a status update.

“Your dad is off on the third and final test flight and I was told not to bother him,” he said apologetically.

“Okay. But, tell Haz that I have great news for Dad.”

By the time Haz took a seat at the radio gear he was about ready to tell Tom what was going on. But, before he had the chance the emergency radio came to life.

“We have them, Colony Control. Taking off in thirty seconds with direct flight back to base. Be there in four hours.”

Haz let out a great sigh and switched to Tom’s frequency. In as few words as he believed necessary he told the young inventor there had been a small mishap, that the ParaExplorer had been forced to an unscheduled landing, but the three men inside were now rushing back.

There was a pause not associated with the signal time before Tom asked, “Can you cut the BS and tell me exactly what happened, Haz? Please?”

The colony manager gave him as much information as he knew, including the probable broken ankles of one man and his father’s ribs.

“When they get here our very own doctor will put each of them under that SimpsonScope of yours so we know the real deal. I’d say that your father will tell us to take care of the others



first—you Swifts are like that—” he said imagining the grin on Tom’s face at that moment, “but I’ll insist he at least be number two. We have a good supply of that bone putty I hear you once used on Doc Simpson to get your dad’s ribs back in place. Then, we’ll package him up and send him home. Uhhh, was there something about good news for him?”

“When he gets there, and especially if he gives you any guff, tell him he is a grandpa for the second time, that she is a little beauty just waiting to pull on grandpa’s nose, and that he needs to get back here with the remains of the vehicle. And, can you tell me why Red and the guys with the *Goliath* are not racing out there to the rescue?”

Haz Samson did something he rarely did; he sighed. “Red and the others are all down with some sort of bad chest congestion, Tom. So much coughing they really can’t fly *Goliath*, and nobody up here is checked out on her. Had this happened a day earlier or two to three days from now, it might be different. We think it is something they came up to Mars with so they are quarantined in the ship. They’ve all been given a large dose of that new antibiotic out of France and are responding to it, but I conferred with Red and told him that unless he was one hundred percent, or even ninety, then he stays grounded.”

Tom signed off after eliciting a promise to have Damon call him as soon as he was able, then he made another call to Doc Simpson.

“Haz says they are so congested in the chest and lungs they have been on oxygen the past four hours. Came on fast and so far is limited to the *Goliath* crew. Do you have any ideas?”

“Unfortunately, I do. Just this morning I got a notice from Fearing Island they have about fifty such cases all hitting about the same time. They are still trying to track things down, and I’ve alerted Harlan Ames and his folks, but it seems as if something may drifted out from land. It has all the earmarks of a biological agent but until I see some culture results it is too early to know if it is man-made or a natural thing.”

Tom felt a great sense of dread run through his body. It took him a moment to regain his composure.

In a much lower voice, he asked, “Are you saying Fearing may have been deliberately attacked with some sort of biological weapon?”

“Again, skipper, too early to tell. Once I have those cultures and can analyze what we’re dealing with, I may have to pull rank

and have *Goliath's* crew, your dad included, left up there for a few more days. And, before you ask, they have the same facilities and abilities to fix his broken ribs. They can even, if need be, operate on the other crewman's ankles, although I know they would prefer not to."

"I have to go, Doc. Got to figure out how to get everyone back down here as soon as possible without spreading whatever they've come down with. Bye!"

Tom went back to Bashalli's room arriving just as she was opening her eyes and kissing the new baby on the top of her head. She smiled at Tom but could see something was on his mind.

"Should I ask?"

Tom shook his head. "No. Just a logistics issue I need to take care of back at work, but first, I want to hold Mary in my arms and explain how wonderful her mother is."

Bashalli gladly gave up the baby and soon had happy tears running down her cheeks as Tom cradled the little girl and Mary obliged by yawning, gurgling, and turning her face into his chest.

When the nurse came in ten minutes later to take the baby, she complimented both new parents on how they were taking to the new baby.

"I know she isn't your first, and I also know it isn't my place to tell you what to do, but may I make a suggestion?"

Tom and Bashalli nodded.

"Okay, it is this. Scrub your little boy, dress him in newly laundered clothes and bring him in later tonight. Then let him sit in that chair over there," he hooked her thumb to indicate the seat, "and allow him to hold his little sister. It seems to go a long way to bonding between siblings and should give him a sense of closeness most children do not get."

They agreed with her and Tom said he'd bring Bart in that evening, after Bashalli had another nap and her own dinner.

"But, now I have to run out to Enterprises and take care of a few things that came up with dad off planet."

As he was leaving he opened the door to Mr. and Mrs. Prandit.

"She's in there and the nurse is about to take the baby for some more standard checks. But, go on in."

By the time he arrived at his desk there was a message waiting from his father. He clicked the button to play it.

*“Son, I am okay as are, for the most part, the two men I was out there with. It appears we took a one-in-a-billion hit from some debris from outer space. Hit the canopy and collapsed it. Most of the port side cables snapped and we hit the ground with that side down. Pretty hard. The gondola survived as did we. But, I’ve just arrived back at the colony and been told I can’t go aboard the Goliath because her crew is quarantined. No idea what that is about, and not certain why I haven’t come down with what they have, but they need to keep us up here for three to five days. Explain to your mother, your wife, and my new granddaughter that I will see them as soon as I can.”*

He called Harlan Ames to see if he knew anything new.

“Well, everyone who came down with whatever this is was on Fearing at least two days before your dad arrived and they took off, including *Goliath’s* three pilots. If it is virulent, he will be showing symptoms by this time tomorrow. We also know the only people who came down with this still on the island were outside and probably within a quarter mile of the *Goliath* as she sat out, being readied.”

“So, either a narrow band of wind blew something in—”

“Or,” Harlan interrupted him, “as we now believe, a small missile came in, hit just off shore or close to the ship, and dispersed the biologic.”

“Then, this was at attack?”

“It sure looks like it, Tom. And, it points out a weakness in our security out there as well as all Swift facilities!”



## CHAPTER 7 /

### IT TAKES MORE THAN ONE WING...

BUD HAD to insist that Tom allow his father and the others come back on their own. The inventor was all for hopping into one of their other spaceships, hopefully a fast one like the *Challenger*, and head out there immediately.

“Unless Doc here and Mars Doc tell you the situation is dire and you have to come, just stay here. You know, with Bash and Bart and little Mary? If I were your dad I’d be a little put out that you rushed up there only to find everything and everybody was fine and they even had to wait around a day or two for you to get there rather than to just come back in the *Goliath*. Besides, what could you take out there that would be as fast as letting the *Goliath* come back on her own?”

“Bud, you’re right, but the urge to go save him is pretty strong. I now understand a lot of what he went through for a few years when I have more sense of adventure than common sense.”

“I know, but remember last year when I flew out to California in a great big panic over my dad’s heart attack?” Tom nodded. “Well, then I get there and he’s on the back patio sipping iced tea and reading some trashy novel about a woman detective and her faithful hound dog. He looked at me and said, and I swear this is true, ‘Don’t tell me your mother got you all the way out here just because I had to spend a night in the hospital!’ He yelled for her and calmly read her a loving version of the riot act before telling me it was good to see me.”

“Yeah, and I understand that, but I feel guilty about asking him to go fill in for me and then this happens.”

“Right, and he really balked at the chance to get out from behind his desk and get his hands on something fun? You let me listen to his message and all it says is some freak accident with a bit of space debris that even the mules up there ignored caused the crash. They’ll bring the ParaExplorer back and you can have a good day or two tearing things apart and figuring what to do.” He stopped and looked at his best friend and brother-in-law.

“It could just as easily have been a hit on one of the domes, Tom. Maybe it’s time to put one or two in-atmosphere drones up there for closer protection?”

This was an idea that Tom had pondered on several occasions but had taken no action. Now, the time had come to get serious

about it.

He made a call to the Construction Company speaking with the manager, Jake Aturian. He filled the man—his father’s best friend—in on what had happened and asked if a trio of new drones might be built and sent up.

“I’ll need to do some new programming, Jake, and possibly replace one of the sensor packs with one that can detect much smaller objects—”

“And heat signatures,” Jake suggested. “Just in case something starts entering the atmosphere up there and heats up, you know.”

He could not see it but Tom was now grinning. “Good call. And, a great place for me to start. Thank you.”

When told it would be about two weeks he only asked that the upper sensor bay be kept unsealed for at least seven or eight of those days to give him time for his own work.

“Will do. Can we send them up on their own or do you intend to ferry them?”

Tom agreed to ask Haz and his father what they thought before giving the final answer to that.

Two days later the situation with the crew on Mars and all personnel on Fearing Island resolved itself. With almost the same rapidity as it came on, the illness disappeared leaving its victims tired but basically healthy. Blood and throat cultures were all negative.

“It must have been some short term incapacitating bio-agent, Son,” Damon said as they spoke over the radio. “In and of itself that is pretty insidious, but points to a non-lethal approach by whoever it was that sent it to the island. Did anybody figure out how it got there?”

“Harlan says it came through on a fairly narrow wind band and had to have been released within close proximity of the island. That means somebody either swam in underwater and surfaced long enough to release it, or sent it out in some very small remote control boat. Like a hobby model. If it were electrical and running slowly enough our sonaphones could easily have missed that in the normal ocean sounds.”

He agreed to take on a side project to create an ocean-going version of his flying drones, one that would run on the surface and surround the island in a listening net.

His work on the enhanced detection package for the

Attractatron mules destined for Mars took less than a day. It ought to have not surprised him but Enterprises' own Electronic department had created a more sensitive detector with heat sensing ability about a year before for watching around the Citadel out in New Mexico.

Over the years they had been "invaded" by strange lights at dusk that turned out to be prairie dogs turning in a group to watch the light disappear, and again a year or so later when some environmentalists tried to breach security to try to show how vulnerable, and therefore potentially deadly, the facility was.

In both cases the culprits had been determined within a few days (prairie dogs) or a few hours (people) and measures put in place. This included a new sensor ring fifteen miles from the facilities with the new combination sight/sound/infrared sensors.

He had a new pack built and tested before the end of the second day and the plans over to Jake the following morning.

Two more days passed before he received word the *Goliath* was just ten hours out and would be touching down at Fearing Island for a thorough cleaning and sanitizing.

His father asked that only Anne Swift be there to greet him. "She's been rather desperate about this, Son, what with her understanding of biology and potential biological weapons. So, let her come out and fawn over me, then I'll take her home and we can cuddle until she feels safe letting me go back out on my own again."

His son chuckled. "Okay, I'll arrange for Deke to fly her out and then the two of you back. I'll call her."

Tom's own wife was a bit like his mother in that regard. She knew he could and would take care of himself whenever possible but fretted over anything out of his control. He also knew that as much as she loved her father-in-law, it would likely be more than a few days before she would expose her children to someone who could have been ill.

Even if he never had come down with the mystery illness.

"I understand, Dad. Unless you're really beat she may want to have a welcome home dinner. If you are up to it I'll see you tonight. Otherwise, I have a few things to tell you tomorrow. Nothing that can't wait."

Dinner did not happen and so Tom waited for his father to come in the next morning. When he did they sat in the comfortable conference chairs and had a coffee while Tom

described what had been going on.

“A lot of that can wait until I get to see my new granddaughter, of course, but I’m curious about this research you’ve made that says the whole set of limitations imposed will mean failure for anyone taking on this solar challenge.”

Tom sighed and related what he’d read in no fewer than five articles in journals dealing with energy and, more to the point, electrical energy from sunshine as it relates to flight.

“These different experts all say that the only way to accomplish an around the globe flight, non-stop, using solar power is to get as high as seventy-five thousand feet as late in the day as possible and then nearly shut down all systems until you catch up with the sun and hope you are above two thousand feet at that time.”

Damon sat looking at Tom through the steam coming from his mug.

“I may have never told you about your great-great-grandfather Barton’s one-and-only brush with multiple experts.” Seeing no reaction from Tom, he continued. “If it were to have been turned into a book it likely would have been called Barton Swift and the Flying Wedge. It seems, and I’m getting this from his son, your namesake via my own father, but Barton was approached around eighteen-ninety-eight to construct a flying machine for a very wealthy man. This man had seven people working for him day and night researching how to get man into the air and keep him there. Safely, I’ll assume.

“These experts all agreed that the way to force a vehicle into the air was the same principle as splitting a log. Use a wedge.”

Tom was about to say something when he realized his comments were not requested.

“So, the man got Barton to take a stage down to Albany and a train to New York where they all met. He’d already made some inroads as to how he might attempt to fly, but had so many other things he’d never tried them out. But, these men didn’t want to hear about that. ‘Build a hollow wedge with a large fan at the back and a seat for a man inside and tilt it at such an angle it wedges into the air and it will climb and move forward until it is slowed to the point it comes to Earth,’ they told him.

“Now, Barton Swift was an outright genius and I doubt a single one of these experts could match his intelligence, and perhaps not even the best pair of them combined. But, he listened and made a few sketches while they congratulated



themselves on their incredible insights. Then, the wealthy man asked him how long it would take.

“I suppose you mean to built such a contraption and not for whoever is trying to fly this thing the first time to die,’ he told them. They were shocked and sputtered and demanded that he tell them why. Know what he said?”

“Not a clue, dad, but I am quite interested.”

“He said, ‘Gentlemen, if you look around you and into the air you will not see man naturally flying. What you will see are birds, and believe me, they have it right. It takes more than one wing for them to fly and it will take a heck of a lot more than a foolish wedge of wood and fabric to get a man up among them. Good day!’ and with that he left them.”

Damon now looked a bit sad. “Three months later there was a news article that managed to get up to Shopton about the wealthy man and about his untimely demise in a flying contraption a small team of men built for him and launched from a cliff over the New Jersey coast. Then, once it crashed they all but disappeared.”

Tom thought about it a moment. “So, no matter what the so-called experts tell you, even if they have their own unproven facts and figures to back it up, that doesn’t guarantee they are correct?”

“That, my son, is what I am saying. Take anything coming from someone who has not done it themselves—whatever ‘it’ is—with a grain of salt. If it can be done the way they claim, they should have already done it that way. So, you keep up with what you are doing, and that is to use what you already know to be true, add to it in small and large steps and leaps, and I am certain you will prove them wrong, and validate what the X-Prize folks believe will be possible.”

Tom reached over and shook his father’s hand. “Thanks! My brain has been tugged and shoved in a lot of directions these past couple weeks and having you crash on Mars nearly put me in despair, but I will take what you told me to heart and keep going. Also, just so you know two things, I am making slow but steady progress on the battery and charging front, and...” now he grinned, “your granddaughter is about the prettiest little girl you’ll ever see. Other than last night it has been difficult to keep the grandmothers away or at least get them to go home in the evenings.”

It surprised Tom when on arriving home that afternoon Bashalli was getting both children ready to go out.

“We are having dinner with your parents, Tom. I got a call from mother Swift this morning asking us to come over and when I hesitated—I want to make sure the babies aren’t exposed to whatever made everyone sick up on Mars—she laughed and had Doctor Simpson call me to say it was okay and that your father never was ill.”

Tom handed her Bart’s small bright red cotton jacket. “Great. What are we bringing?”

“According to your mother we are only allowed to bring the babies and a small side dish. I made the brown butter sautéed cauliflower you and your father love so much.”

Tom’s mouth began to water. It was then he realized he skipped lunch entirely and was quite hungry.

The dinner was mostly secondary to letting Anne and Damon play with their grandkids. Bart really loved his grandpa and spent a lot of time perched in his lap telling him about airplanes and how “dadda’s making power by squeezing the sun,” while Anne and Bashalli fussed and giggled over Mary. Then, and with a quiet word in Bart’s ear that it was his sister’s time, Damon cleared his throat and made a “give her to me” motion with his hands.

Mary had been wide awake with the women fussing over her but looked at her grandfather, smiled a little toothless smile and closed her eyes. In seconds she was asleep in his arms, and he was looking down at her as proud as could be.

Just nine days later Jake Aturian called to tell Tom the new drones for Mars were ready to go.

“You managed to get the new sensor package and programming finished in record time, so I thought it only right we should return the favor. Oh, and all three have had a test flight out to and around the Moon last night, and one of them snagged an incoming half-inch meteorite as they entered the atmosphere. All systems are go, Tom.”

“That’s great, Jake. I’m kind of tied up at the moment so go ahead and give them a little pat on the nose for me and send them up. I’ll call Haz and tell him to expect them in a few days. And, thanks, again to you and your people.”

He did step outside the building a few minutes later and turned his gaze toward the northeast and the Construction Company. Just two minutes after that the trio of new drones shot into the sky and were out of sight in seconds.

Tom returned to his desk with a smile.

“Haz,” he said into the telephone receiver where his voice would be transferred to the nearly instant radio equipment used for inter-planet communications, “I just want to tell you a small herd of little angels is heading your way.”

“Pretty little things all dressed in flowing white robes and singing ethereal music... or something else, Tom?” he asked good-naturedly.

“Well, actually about twenty feet long, thirteen feet wide, black and silent as can be.” He told the colony manager about the forthcoming drones.

“They’ll station themselves above the colony under normal conditions, and when you get the ParaExplorer back one of them will tag along for extra safety and to avoid what happened to dad and your two men. And, as a bonus, they will drop whatever they catch into a small location about a half mile from the colony so you can examine what is incoming at your leisure. Might help us understand where all these are coming from.”

The big man’s laugh came over the receiver and it made Tom smile. “Well, and I think you’re going to like this, we may be able to pay you for them in pretty short order. I got the report from my tri-copter pilot, the one who got to the gondola first, and it mentioned something odd about where they crashed. They broke open an outcropping that contains something he believed warranted investigation. So, I sent a team out the other day. They found the spot, and something else. Now, it might play havoc with a few Earthbound businesses that are about the only sources for what they found, but we have a small lode of chrysoberyl, otherwise known as Alexandrite. Pretty rare gemstone on Earth and so far only about eighty pounds of it up here, but by my calculations that ought to fetch better than ten million at market prices.”

Tom was nearly speechless but asked if Has was certain they didn’t want to sell them for colony funding.

“For crying out loud, Tom. After the millions and millions Enterprises has pumped into this colony over the years it’s about time we gave back. Obviously if we had a sales presence on Earth and a team of gem experts and a marketing force, and... I think you see where this is going.”

“Yes, I do. I don’t know what to say other than wow, thanks, and as Bud is given to exclaim, ‘Jetzt!’”

\* \* \* \* \*

Tom spent a day working with one of his battery technologies to see what weight versus storage and output he might expect. The thin, flexible, layered battery was made by a silk-screen technology that placed a thin non-conductive layer down first, then spread a positive layer, a layer of an electrolyte gel and then the negative layer with the final nonconductive layer completing it. In all, it was about three millimeters thick and any one-meter-square piece could produce twelve-point-six volts and store nearly one hundred watts of power.

He was describing it to Hank Sterling the next morning.

“I figure if the wings are stuffed full of as many layers as we can get in there and still leave room for the power transfer circuitry, I can get just over thirty percent of our electrical needs handled for up to eight hours of darkness.”

“And the body cavity can handle the rest?”

Tom shook his head. “No. In all they combine to give us about eighty-five to eighty-seven percent of that power. I’m still going to have to find some more electricity somewhere, but I’m happy we are getting close. The X-Prize committee has been keeping tabs on all the entries and is setting the flight date for four months from yesterday.”

“Ah, so they’re not doing a first one up and around wins it all, huh?”

“No. This time and with so many capable entries, they want this to be a real race to better capture public interest. It’s okay with me either way, but having a hard deadline now puts some pressure on me to get the power and battery thing cinched down.”

On returning to his large lab he tried one more experiment. This time rather than the half-millimeter thick positive and negative and electrolyte layers, he doubled their thicknesses. His test piece was ready two hours later and he carefully sealed the edges and strung the thin wires sticking from opposite corners over to a power measuring board.

Knowing it would be a better test if the power going into the battery were coming from a solar panel rather than a plug-in source, he rigged up his one meter solar cloth panel made from Thomasina Swift’s special graphene fabric and placed a powerful sun lamp over it.

A small intermediary box to keep the sun power going in and the stored power—only—coming out was attached and he sealed up the test chamber.

On more than one occasion simple experiments had gone awry and having the unbreachable tomasite panels between him and whatever had saved him countless injuries.

Tom checked to see that the battery was beginning to generate its own power just from the interaction between the electrode layers and the electrolyte, but it was still minimal.

The lamp turned on at his press of a simple switch and began generating heat and power. Excess heat was removed from the chamber by a small fan and exhaust vent while the power was fed steadily into the double-thickness battery.

For more than fifteen minutes the battery was accepting the power sent to it and all indications were it would continue to take as much as Tom allowed to be fed in.

However, power in was only half the story and he next flipped a switch to send power from the battery over to an electric motor turning what amounted to a small merry-go-round. It picked up speed and he soon found it necessary to dial back the output or else face the possibility of burning out the rotating device.

With some alarm he spotted one readout of the battery that told him it was reaching saturation point and was not sending out enough electricity.

As his hand shot out to press the “kill” switch the battery inside the chamber suddenly puffed up like a whoopee cushion and exploded in a blinding flash and thunderous *boom!*



## CHAPTER 8 /

### AN INTERESTING OPPONENT

“NOPE,” HE said out loud as he stood back up and reached for the phone to notify his father and Security he was okay. “That is most certainly not the way to do this.”

The smoke was clearing from the test chamber when the door to the hallway slammed open and Chow raced in brandishing a fire extinguisher.

“What in tarnation happened?” he demanded on seeing there was no terrible scene of destruction and that Tom appeared to be just fine.

Tom laughed in spite of the situation. “Just a battery experiment gone a little wrong, old timer. But, I greatly appreciate you hustling in here and to my rescue. And, I have to say that new shirt of yours is nearly as bright as the flash inside the chamber when my battery went *kablooey*.”

The chef set the extinguisher down at the same time an announcement came over the loudspeaker system.

*“There has been a non-injury explosion in lab number one. No fire or damage. No crews need respond...”* and it repeated one more time.

“Whatcha doin’ that went bang?” Chow asked forgetting Tom’s compliment on his attire. As he seemed genuinely interested, Tom told him about his experiment to try to up the power of his thin battery.

“I guess I learned the hard way that I had things nicely balanced before and this new, thick version just had too much of something and not enough of something else. I might get it right, but I’m thinking it could be a dead end road. I don’t suppose you have any words of wisdom for getting more power from the sun?”

Chow had left his ten-gallon hat in his little kitchen so when he reached up to take it off, it wasn’t there. His hand dropped and he pulled over a lab stool.

“Wahl, my ex-peer-ee-ance with sunshine is mostly out in Texas and New Mexico where it seems ta shine down about twenty hours each and every day. And, it’s hot, ta boot! Can ya make power from heat?”

Tom explained that one of his sources would be the special cloth from Tommy and Betty and that it did make power from the heat it self-generated when exposed to sunlight.

“My problem isn’t so much during the day when I can make all we need, it now seems to be a matter of how to store what I will use at night. Right now I’ve got a situation where I need to run a really bright light and a fan for eight hours, but I can only store power for a little over six. And, I must run them both all the time.”

Chow let out an appreciative whistle. “I ain’t got the learnin’ ta help ya there, Tom, but I do have all the faith is the world in yer ability ta figger it out.” He rose and headed for the door, “You keep me in the know, okay?”

Tom agreed to do that and watched as the cook picked up the extinguisher and left the room.

A minute later his father opened the door.

“Safe to enter?” he asked with a smile.

“Unless you are afraid of catching my didn’t think it through problem, sure. Come on it and I’ll tell you the short but great tale of how young Tom Swift forgot physics and blew up a perfectly nice new test battery.”

He filled his father in on what he had been trying and the older man nodded his understanding.

“Let me guess. It got to the saturation point and exploded. Seems like this is the second time that’s happened or nearly happened. What are you going to do now?”

Tom had a think for a moment. “Well, for starters I have to clean up in there and see if I blew apart Tommy’s solar fabric or if it just came free of the frame,” he said pointing at the mangled wooden square and knot of fabric. “Then, if I want to try this again I’m going to need to rig up an auto-shut-down based on what is going in and coming out. Or, I have to put a much heavier load on the thing to drain off power even faster than it can be replaced.”

“That last one would be my preferred option if this were my experiment,” Damon stated. “Need any help with the clean up?”

Tom shook his head. “No, as you told and told me when I was young, if you make a mess you clean it up right way and before trying anything else.”

Damon smiled as he clasped his son on the shoulder, gave it a loving squeeze, and went back to the office next door.

The inventor’s next experiment the following day was no more successful—but less explosive—than the first one so Tom set aside the notion of beefing up the battery. He would need to find another way to store or get more use from the electricity they



could hold.

*It's a darned shame I can find a way to make power at night,* he mused. *The Moon's reflected light isn't bright enough.*

The X-Prize contest had now been progressing for four straight months and the organizers made a call to get everyone out to California for an important meeting and status check.

Aircraft design plans had to be at least fifty percent complete and presented along with as many electrical specifications as possible. They acknowledged that not everyone would be at the same point, but they wished to assure themselves nobody was heading down a totally wrong path that might lead to injury or death.

“They want us both out there, flyboy, so in three days we take the Toad to Burbank Airport and meet with the people we’ll be vying with for the prize.”

“How are we supposed to get from Burbank to their headquarters in Culver City?” the flyer asked. Both young men had been to the company originally headed by Peter Diamandis several times and knew it was more than a quick taxi ride.

“The message says that transportation is provided as long as we land within a two-hour window.

“Count me in, but plan on getting a call from a very pushy young, blond woman who may give you a phony name and try to tell you I am unavailable.”

“Dad’s taking care of that, Bud. He got the note first and immediately called your beloved to tell her to expect you would be forced to attend the meeting. Just play it as though you’d really rather not go and she’ll push you out of the house that morning.”

When they got back together the following morning to discuss what they might have to do if a presentation were called for, Bud started by telling Tom everything had gone smoothly at home the night before.

“She isn’t what might be called the happiest bunny in the cabbage patch but she says she understands and wants me to go as long as this isn’t an overnight trip. I tried explaining that we don’t know, but can’t believe it would be more than a few hours once we’re out there.”

Tom agreed. “We’ll leave around eight and get there at eleven, Pacific time. The meeting is set for one, so we’ll have a buffer. If we had an extra day or so I’d have liked to go back to the studio and watch them shooting a pilot for a TV show based on the

ThermoIon Jetpack and that movie we all made.”

Bud's face lit up. He had enjoyed being the stunt pilot for the jetpack when a succession of real stuntmen had failed to perform.

“Get the grin off your face, mister movie guy,” Tom warned him. “They have borrowed the nonworking version and will be doing all flying in front of a green screen and with computer animation. At least our friend, Brian Pemberly, gets to reprise his leading man role as the flying Sky Marshall. But, as they say, you can't get there from here, or at least not from Burbank airport to the studio in the time we might have available.”

Early on the departure morning they met at the Barn where Tom's Toad had been flight prepped, fueled and even had its tires changed giving them fresh rubber to roll on.

The tower cleared them for take-off but because of timing with the incoming Albany to Shopton morning flight they had to use the east to west runway meaning they had an extra four minutes of taxi time to get out there. But, with little other delay and with excellent flying conditions being reported they took to the air and headed up to their flight altitude.

“Got to love this jet, skipper,” Bud told his friend. He was at the controls and would fly them out with Tom doing the services coming home. “She runs along on little cat feet courtesy of the new tires, and then just loves to jump into the air all on her own.”

That plus other excellent flying characteristics endeared the SE-11 to absolutely everyone who flew one.

The Midwest came and went and they had the chance to overfly two of the power generating facilities that had been damaged by the Electricity Vampires. Both showed signs of repairs being made but Tom knew at least one of them was perilously close to being shut down for good. It had been within five years of useful life when the strike blew out their numbers one and three generators.

But, that was out of the hands of anyone at Enterprises. A suggestion that a Swift nuclear reactor station could economically replace what they had had been rather rudely turned down.

West Coast Control had them come down and through a gap in the mountains to the southeast of the LA basin passing over Banning and Beaumont, California before turning to the northwest and heading for Burbank International Airport. They flew over Pasadena and could see the University of Southern California football team out having a spring practice session in

their historic stadium.

Burbank approach gave them immediate permission to land on their number 33 runway after which they taxied to the apron near the newest civilian terminal.

As Tom got out of the jet he espied a female figure approaching from the direction of the nearest hangar. She was dressed for much warmer weather; her halter top seemed completely inadequate and inappropriate for the day's weather, even in California.

The woman—she must have been about thirty Tom decided as she grew closer—had a smile on her face as if she was hiding a set of dangerous fangs. Her eyes spoke of mischief and even a hint of cruelty.

Holding out her right hand, palm down and fingers curled slightly underneath, she told them, “My name is Octavia Dale. I don't generally make friends but I shall tell you now that those who do cherish that honor call me Tavia. Those even closer call me Tavi.”

Bud brushed past Tom and took her hand. “I'm Bud and that is Tom... and he has one of those at home, so thanks for the intro, but we have to leave now.” He turned, reached up and closed Tom's mouth that had fallen open, and turned him around using the inventor's shoulders.

As they walked away, Tom said from the side of his mouth, “What was that about?”

“Which part?” Bud snorted. “The woman, the intro, or what I said?”

“What you said.”

“Come on, skipper. You've got Bashalli who is also Bashi to friends and Bash to you... well, and to me. I think that woman was sizing you up for her trophy case, or at least her next meal. Let's get going before she slithers over and nips at our ankles!”

When they got to the minibus waiting to take them to the offices, Tom stopped. “You know, Bud, you're getting a little strange these days. I'm certain she was just having a little fun with us.”

He was about to say more but the flyer's head was shaking from side to side.

“Not sure how to tell you this, Tom, but your RADAR is either broken, shorted out, or just plain not turned on. Or, haven't you read that kid's story by Kipling. The one with the mongoose named *Rikki-Tikki-Tavi*. The one who crushes snakes' heads in

with its powerful jaws?”

Tom looked at his brother-in-law and shrugged. “Fine. We go for now but if she turns out to be a nice person I hope you’ll apologize to her.”

“Sure,” Bud assured him while thinking, *Fat chance of that!*

The two climbed into the vehicle and were soon scooting around the complex to the newest offices of the X-Prize organizers. Octavia Dale was not with them.

Inside the main building Tom and Bud took a short detour along the hall featuring all past winners of X-Prizes. Close to the beginning of them all was the official photo of the two of them —“Did we really look that young, Tom?”—standing in front of the *Star Spear* about fifteen minutes before they had climbed aboard for take-off.

A man came to interrupt them and they were escorted to a small auditorium where at least thirty-seven other people, nearly all men, waited to find out why all registered contestants for the solar X-Prize had been called in. They only had to wait for five others to arrive—including Octavia Dale who was alone—before Rebeccah Speers came in and knocked on the lecture for their attention.

She flung her hands out to the side like an old-fashioned circus showman, proclaiming, “Welcome to our second facility here in Burbank. Wonder no more! The answers will be given to you in only a few short minutes!” She then took a small bow and left the room again.

“Nutcase, or trying to build excitement?” Bud asked out the side of his mouth. Tom nudged him to stop but secretly was wondering about the sanity of the woman who supposedly was running the both the current contest and the entire X-Prize organization.

There were a lot of murmurs coming from all over the room as people discussed whether this was going to turn out to be a waste of time... and money.

“I barely have enough to keep my people from leaving me alone in this,” one woman in the back was telling another contestant. “This better be good!”

Ms. Speers came back in and looked at them all with a bright smile on her face. As she retook the lectern the crowd became silent.

“Well, well, well,” she said and smiled even more brightly as her gaze swept the room. “I see we have just about everyone

here... except—” she looked pointedly at the empty seat next to Octavia Dale and her eyes misted over as if she had suddenly become very sad. “Oh, dear. And, can you tell me, Ms. Dale, where your flying partner is? This was called for *everyone* who will be flying to attend, you know.”

Giving their host a look that spoke of her disdain for being called out, Octavia stood. “My co-pilot is sick. He has come down with some sort of terrible disease we believe was sent to our facility by another company who was supposed to be testing a perfect little helicopter for us. Instead, they crashed it and, or so we believe, they infected some of the parts with this disease. Poor Sky is so sick, both because I know how he wanted to be here, and because of this disease.”

She sat back down after pointedly looking toward Tom and Bud.

Rebecca looked at the woman with disbelief in her eyes, finally saying, “Well, that makes a convenient excuse but until you can provide medical proof of both his *disease* and your assertions that someone sent it to you specifically to cause you to not be able to complete this contest, I suggest you try to find another stage from which to sling mud.”

She looked at the rest of the room.

“Now, here is the reason you are all here, with *the one exception...* that is to provide us with proof of who you are including age, your weight, proof of citizenship, and to show us your flight logbooks. As you will recall we have strict guidelines for whom can participate. If you lack anything today, I suggest you contact someone who can ship it out to you overnight because tomorrow we chop. Oh,” and she smiled sweetly at Octavia, “that means even our missing person’s particulars.

“You will also receive,” she added, “a supplemental package of data and instruction along with your serialized data tracker/recorder that is entirely self-powered, but needs to be installed according to our specifications. We’ll be showing you that installation in a few minutes.”

After the one-hour review and demo of the installation concluded, including a brief Q&A, she told them to line up according to the last name of the primary entrant whether or not they had everything with them at the moment.

Octavia was so flustered by what she felt was unfair treatment that she mistakenly headed for the back of the line thinking she was listed by Whitcomb Aeronautics. Someone must have pointed out where she should be so she trudged forward in an act

that did nothing to improve her already sour disposition.

She was third to be called forward and Tom and Bud had to grin on hearing her trying to argue with the organizer.

“You have no right to demand Sky get out of his almost death bed and come here!”

Calmly, Rebeccah asked her, “Did you read the request letter we sent out one week ago? I ask because had you looked at it in its entirety it spelled out everything including that both parties had to be here, or if one was medically unable to attend that a physician’s letter detailing the reasons and all medications being prescribed and for what duration must be brought here today. I can accept the necessary documentation, or your partner’s presence, up through eight pm tomorrow. Next!”

When Octavia refused to budge, Rebeccah told her, “If you are trying to set up either a rival or an entrant you feel is stronger than you by your tirade about diseases and helicopters I strongly suggest you either resign from the contest, or stop it. As in this instant. We tolerate no shenanigans. Good day!”

Octavia Dale stormed past Tom and Bud, trying to move far enough toward them to bump into Tom as hard as she could, except that Bud saw it coming and pulled Tom about four inches to the side causing her to not just miss, but to take a bad step and nearly fall to the ground.

She let out an angry shriek and ran from the room.

“We’ve got a few, Bud. Why don’t you go back to the airfield and make sure our new friend isn’t going to try any funny business with the Toad.”

Bud smiled, saluted and ran from the room.

Fifteen minutes and four more entry teams later, he returned.

She climbed in her little business jet and looked to be heading to the Toad to clip it with her wingtip, but, with both me and one of the airfield security men standing there she made a very rude hand gesture and steered away, taking off and probably without getting clearance.”

They talked about the woman and tried to determine her basic problem until it was time to step forward.

“Welcome, Tom Swift and...” she looked at her clipboard, “Bud Barclay. Do you have your papers?”

They handed them to her and she made tick marks in boxes on their form. Taking the plan diagrams she and another two men sitting at a second table looked them over, made several

notes on their papers and finally added an APPROVED stamp to the lower corner of each page.

“Everything in order. Congratulations. You and—I believe—five others are in the lead on just about everything. We are very happy with what we are seeing from nearly all entries. Questions?” When both men said there were none she lowered her voice and leaned over the table to them.

“Octavia Dale has tried to make trouble for you once before today. She called a week ago to tell me you had sabotaged their latest aircraft and she wanted it on record she feared you would try to do the same with her solar entry. I just wanted you to know that because it appears she is determined to try to get you disqualified. Word to the wise.” She tapped the side of her nose and gave them a wink.

Tom leaned forward and whispered, “Thank you. Word understood.”

He and Bud returned to their aircraft and made a special and thorough check of everything. All looked to be in order so they climbed in, contacted the control tower and had clearance for take-off seven minutes later.

Bud kept looking around to see if Octavia Dale had hung around intending to do something to them in the sky, but as they raced back to the East and Shopton he saw nothing.

They landed just at a few minutes past nine so after parking the jet at the Barn, both climbed into their cars and headed home.

The next afternoon Tom received an email from Rebecca Speers.

To: Tom Swift

Fm: R.Speers@Diamandis.org

Tom, Just to follow up, Octavia Dale and her co-pilot arrived here this morning and presented all documentation. They brought no medical proof of any illness and made no mention of it. So, all entrants are accounted for and all are qualified.

Good luck to you and the other eighteen teams,

Rebecca

Tom, who had earlier told his father about the woman and her assertion of wrongdoing took the printout over and let Damon read it.

“Well, all you can do is keep an eye out for her and try to avoid

any confrontations. Also, bring Harlan into this so he documents everything.”



## CHAPTER 9 /

### FIRST MAJOR BUILD GETS OFF THE GROUND

JUST ABOUT all aircraft coming from Swift Enterprises began in the computer, then graduated to the workshop of Arv Hanson before ever seeing full-size reality.

Arv was the company's chief model maker and a whiz at anything built to scale. As testament to his work, one entire wall of the shared office held several shelves with his miniatures of both Damon's and Tom's work.

Before coming to work with the Swifts, Arv had been a prop designer and miniatures builder for several Hollywood studios. He even had an Oscar award for his work, but he kept that at his home rather than showing it off at the office. He was proud of his previous life but enjoyed where he was now, and what he was doing, more than anything.

Tom hiked over to his workshop in the building situated two over from the Administration building to the east.

Between them was Security.

Arv looked up from one of the large work tables that filled the majority of the outer area of the workspace. A huge smile spread across his face and he pulled off the magnifying face shield he'd been using for some fine trimming work on the model of the new version of a Outpost in Space, set everything down and came over to shake his young boss' hand.

"Welcome to the shop, skipper. Haven't seen you in this neck of the woods for a month or more. What brings you over today?"

Tom smiled. "I hope you know it's your own darn fault that I don't get over here very often. If you weren't so fast and exact in what you do I'd have to be here at least twice as often." He laughed. It was true that Arv's work was exemplary often being more than Tom had asked for. That was why many of the scale models of inventions were actual working versions, not static, solid pieces.

Tom pointed to a couple seats over to one side. "Got a minute?"

"Sure." They sat down and Arv turned to look at Tom. "Is this something serious or something fun?"

"I'm hoping it will be fun."

He told the model man about the X-Prize and his struggles to come up with a turbine drive system and battery scheme to let him fly around the world.

Arv let out a low whistle when the time limitation of just a day-and-a-half was mentioned. “Wow. And, all electric, huh? So, do you have some whiz-bang design you want a flying model of?”

“Not exactly... and not even close, to tell the truth. But, whatever it ends up being it will need to be configured for handling the stresses of the speed I need, over five hundred-twenty knots, and hold probably two high-speed—which may translate into high-torque—jet turbine motors.”

He said he had ultimate faith in Arv’s ability to size up a situation such as this one and come up with ideas beyond what Tom might present to him.

“Right. We’re not reinventing anything, just ensuring what you fly will do the job, hold together, and provide some level of safety in case of an emergency.” He thought a moment, “Does that include a recovery chute and even a life raft in case you have to ditch over the ocean?”

The inventor’s eyebrows rose. “Gee, I guess it does. I actually haven’t gotten that far, but wanted to sit down with you and schedule some of your time. I hear tell you are taking Enterprises into the model kit business.”

Arv blushed a little. “Yeah. Your dad gave the go-ahead after we were inundated with requests for models of things like your various spaceships and atomicars and even a scale version of the bullet train. Serves me right for taking some of the models out to that Science Fiction convention in San Diego a few months back. Now, everyone wants one,” he chuckled. “Hank’s been helping with the breakdown into manageable parts and I’ve been turning out 3D printed pieces and knocking them together. Most of them are a dream with the notable exception of your *Challenger* and that is pretty much a nightmare!”

“Well, that aside, and I hope it is an aside and not taking up too much time, I’d like to have a one-eighth scale test bed for trying some of the things that will go into my real solar plane.” Tom showed him the sketches he and Bud had taken to California.

Over the next hour they talked about design possibilities and eventually went to Arv’s office to enter some basic designs into his computer. By the time Tom left the model maker promised to have a more complete design available the following late

afternoon and once approved he could turn out a remote-controlled model in about three days.

Now happy that the first real building of anything associated with the project was being handled, Tom headed for the shared office, but detoured a moment later to go talk to Harlan Ames.

“What can I do for you, Tom?”

“I’m still bothered by the helicopter incident. It could have ended up much worse, but as it is I can’t shake the uncomfortable feeling it was something ultimately meant to hurt or kill either one of our test pilots, or even me.”

The Security man rose and walked around his desk.

“I know the feeling. But, and I hope you understand how this is meant, I have to ask you two things. First, is this feeling more like a paranoia based on nothing more than all the previous times you’ve been clobbered? And, before you answer that, number two is why didn’t someone give that machine such a thorough going over that they might have spotted potential issues with substandard components?”

Pointing to a chair he suggested Tom sit and think the questions over a minute or more.

When the inventor spoke, it came out slowly and deliberately.

“Okay. Number one. You may have something there. I was finding the closer Bash was to giving birth to Mary the more I was worrying about them, and even about me and whether I’d be around to see both the kids grow up and have their own families. I’ve been pretty good about compartmentalizing the bad stuff from the rest of my life, and maybe this is the wake-up call I need to see they are unavoidably interconnected.” He let out a small sigh thought his nose.

“As to number two, I have no good answer. Bud was doing what he does with our aircraft, and part of that was trusting that the helo was built to aircraft standards. I can’t fault him but I can ask dad to make an edict for us all so any time something comes in from another company for testing, it first gets the most thorough examination possible. Down to taking the thing apart if possible.”

Harlan nodded. “Good. Now, I have something to relate about the helo, about Whitcomb Aeronautics, and about this solar flight challenge you are taking part in.”

He detailed a new piece of information he’d received regarding the son of Robert Whitcomb.

“Bottom line is the boy must have been kept in the deep background because there is no mention of him in Robert’s official biography. There is only a brief mention of him having a daughter. I’m going to continue looking into that.”

As to the company, his information was more financial.

“They have been running at a loss for at least three years. The Canadian government is pretty free and loose with taxpayer monies for any industry they believe is not self-sustaining. Their TV and movie industry is a prime example, but the five small avionics and aeronautics companies up there each receive more than a small stipend each year. The idea is when they are profitable they pay it back, but that rarely happens.”

Tom’s face scrunched in a frown. “Why do they keep handing out money if nothing comes back?”

“Habit... Inertia... Whatever. Whitcomb has received about eleven million dollars, Canadian, each year for the past four years but may get cut off if they can’t get something up for sale pretty soon. It’s a wonder they have enough to mount a challenge in this solar race, but maybe they see it as a way to prove some new technology they can sell off.”

“Why tell me all this? Isn’t this more a dad thing?”

“It is and it isn’t. As you will no doubt be in the same sky as their entry, and as they are likely desperate for a win, I want you to be ultra-aware of where they are and what they are doing. Okay?”

Tom smiled. “Yep. Okay, and thanks.”

He played around with a few other types of batteries that day and the next but was fairly certain he’d be using his thin, flexible battery sheets in multiple layers and spacers between layers to allow for heat dissipation during the hot part of the day. It would be important to keep the batteries within a temperature range around the clock so they would take as much input power as possible and provide as much output power as they could.

Too much heat or cold would not be the batteries’ friend.

When he received a call from Arv two days later it was to announce the availability of the first scale model.

“I built it with replaceable wings and a tail in case you want to make adjustments. And, for thrust I found a pair of very-high-speed electric turbine engines for model jet aircraft. They’re capable of a scale six hundred knots in something thirty percent smaller than this plane.”

Tom headed to the workshop almost immediately, but not before calling Hank Sterling—his pattern maker—and Bud.

Hank laughed and said he was standing next to Arv at the moment, and Bud said he would be over in five minutes assuming nobody had taken the electric runabout he'd checked out earlier that day.

The model looked like a sleek and rather stubby glider. The wings were longer than a normal airplane and swept back at a twenty-degree angle. The tail was known as a fin-mounted tail with the horizontal stabilizers set about forty-percent up the rudder from the body.

The two turbines were a little oversized for the wings and their cowlings stuck up above the wing top about an inch and below another inch. It wasn't a lot, but in a real plane that would translate into nearly eight inches above and below, far too much to suit Tom's preference.

"Given it a flight test yet?" he inquired.

"Not powered, but Hank and I ran it around like a kite a little while ago, and it seems to want to behave if only a bit heavy for the speed we could manage."

Bud's little yellow car braked to a stop ten feet away and he unfolded himself from it, stepping over to them with a smile on his face.

"I hope I didn't miss anything."

Hank smiled. "No, just two old men who ought to know better running up and down like idiots panting and cursing."

Bud looked at him as if that had come out in a foreign language, but soon shrugged and his smile returned.

The little electric jet model was sitting on the ground so Arv bent over and opened the canopy. He flipped two switches and closed the plastic cover, taking the remote from Hank and flipping another pair of switches on.

As the small turbines started to spin up he handed it to Tom who looked over to see Hank standing in front of the jet with his legs on either side of the fuselage holding it back from wanting to move forward, even at low setting.

"I guess I'm ready," Tom announced, "except to call the tower."

"Done and we have this area for the next hour," Arv reported.

"Well, then..." and he motioned Hank to step aside and the jet

rolled away from them. The throttles were moved up and within a few seconds the jet skipped off the asphalt a couple times and headed into the air.

He made a series of slow passes overhead taking the jet as far to the west as the main gate area and as far east as Bud's hangar number 6. Next he tried several higher speed passes and noted the stability of the model improved at about three hundred scale knots, but faltered a little above four hundred. He did go full throttle once—about four-sixty scale knots—and nearly lost control so he slid the controllers back and brought it in for a pinpoint landing and taxi right back to their position.

“What's the battery situation?” he asked as Arv went to turn the jet off.

He bent over and peered into the cockpit. “About thirty-seven percent left in the main pack. So, that was what? Twenty-three minutes of flight? If that's the case we need to corral future test down to inside of about twenty-eight minutes to give us some safety factor.”

Tom agreed.

As Bud had to leave for a delivery of a new cargo jet to a company in Atlanta, he raced away a minute later.

Hank also excused himself and headed for his own workshop leaving Tom and Arv to carry the model back.

Before leaving Tom wrote down five things he felt needed fixing or addressing to make the plane more stable at higher speeds, and Arv promised to have four of them done that day and the final one the following day.

Leaving Arv to work on those things, Tom decided to build another test battery pack. It would be necessary to check out his chosen type for both total storage given a specific size and for drain given a specific load.

It was also going to mean a chance to test a solar charging system. For the first tests this would be a five-square-yards in size made from the materials available from Enterprises' own Solar Materials department. Like many robotic inventions, including Damon Swift's now world-famous package delivery kangaroos down in Australia, it was moldable, shapeable and could be made to look like just about any object.

For this application it would be a simple sheet in a wooden frame feeding onto a power stabilizer circuitry box that then fed into the batteries.

Those would be his thin, flexible sheets stacked up with spacing for air flow. His intent was to create a one-cubic-yard pack capable of storing up to fifteen kilowatts of power at nearly one hundred volts.

That might be enough to operate a three bedroom house all day and all night long, with some to spare, but he knew it would be far short of his needs for the type of electrical turbines it would be powering in the solar plane.

“Why do you keep calling this thing a plane, skipper?” Hank asked when he came over to help Tom assemble the various parts of his system. “It’s a jet, after all.”

“Yes, I know, but I keep thinking a jet means jet fuel is involved. You’re right that this is a type of jet, but my brain keeps calling it a plane. We’ll see. Maybe once we get this built and I fly it at jet speeds I can put the whole *plane* thing behind me.”

Together, they produced sheet after sheet of the battery materials until they had more than enough. Next, Tom began the relatively easy task of inserting the wires into the appropriate places and interconnecting the layers. About half way through he asked if Hank could do the rest.

“Sure. It’s straightforward. What are you going to do?”

“Make the electronics to go between the panel and the battery and then rig up a good test load. I want to see how fast the battery fills up and how fast it runs down, so this is going to be a multi-day process. I won’t,” he said looking sideways at the engineer, “be insulted if it gets too boring and you wander off a little later. I’m just thankful for the assistance right now.”

Hank smiled. “What? Leave you to have all the fun watching electrical paint dry? No way!”

But, within a half hour of connecting everything he changed his mind and asked if he might be excused.

“I promise I’ll come back tomorrow and see how things are going, but you are right about this being now a pretty darned boring thing.”

Hank was so right about the boredom factor that Tom eventually wandered away from the test area where they’d set thing up. It was part of the undeveloped “wild” area of Enterprises to the east of the runways and was used for everything from vehicle testing to dangerous experiments that could not safely be contained inside if they went horribly wrong.

This time nothing untoward happened, other than the load

drained the battery pack about three hours before the sun came back up.

Tom rechecked his computations to make certain he had not placed too heavy a load on the circuitry, and found that he had erred, only it was in the wrong direction. Rather than end up three hours in deficit on power, the pack ought to have ended up three hours and six minutes short. It wasn't a lot, but it was not what he hoped to achieve. He was becoming a little discouraged.

It helped a lot when Arv called him to try the model aircraft again. This time it handled beautifully at just about everything from near stall speed through top speed which, to the inventor's surprise, was about thirty scale knots higher than before. When he asked about it, Arv smiled.

"Well, you see there is this thing about using new equipment and not thoroughly reading the owner's manual. I was in a hurry to get the thing built that I sort of neglected that simple step. But, I had time while waiting for the new wings to cure. I found a one-page piece on enhancing output and rotation speed. It seems they put a limiter on the thing to keep it from going faster than forty-five thousand RPM. But, the spec say it can handle fifty thousand without problems as long as the thing is not kept sitting still. If it has the proper air flow over the motor, it will run at the higher revs for hours."

Tom laughed. He couldn't tell you how many times he'd done the same thing figuring it would be easy to figure out things on the fly. It seemed that for every three or four of these occasions, it had come back to bite him in some way or another at least once.

"No harm or foul, Arv. In fact, if we had that extra speed earlier I might have crashed the plane...I mean the jet the first time out. Now we just have to see if tweaking the design will give us more speed, or if the turbines are just not powerful enough. I know we'll run into that with the real thing."

The next two weeks for the inventor were spent between coming up with a better battery pack and helping Arv eek out a few more knots of speed from the airframe.

Finally, he declared that the turbines just were not making the airflow needed, but nobody could find a way to increase that.

It was a decision made by Tom and his father to get ready to upscale testing in the hope that the larger airframe and battery capacity, and therefore additional room for the full-seized



electric turbines, might provide what was lacking in the model.

Now, Tom's time was spent more with the Propulsion Engineering team as they worked to perfect the turbines that would be used in the plane, or jet, that still didn't have a name.

Tom grinned to himself as he realized Bud would take care of that soon enough.

Tom, Dianne and Artie sat at her desk for nearly five hours one day going over each and every component of the turbines.

"We're going to be up against one small issue with friction," she told him. "As in we probably are going to need to build in a lubricated ring bearing at the front and back, and might even need to push cooler lubricant through it on an ongoing basis. At the speed of rotation you need, that's going to get really hot and really fast."

Tom silently wished there was such a thing as a truly frictionless bearing, but it was a practical impossibility according to everything he'd read.

He recalled his father's story about Barton Swift and the flying wedge idea, and nodded.

Dianne and Artie thought he was agreeing with her last statement that she'd need to either find an appropriate thin and easy-flowing fluid, or come up with one.

When he stopped and thought about that statement he then shook his head.

"Yes, or no, Tom?"

"The nod was for something I was thinking about and the shake is for you having to look for your lube. Give a call to one of the Indianapolis 500 racing teams. I know they've cracked the lubrication issue where they pump a couple gallons through a closed system about five times a minute to keep their transmissions from seizing up."



## CHAPTER 10 /

### AHH... THAT SOLAR THINGIE!

ONE OTHER project came up that Tom had to attend to, and that was the rebuilding of the Outpost in Space. For more than seven years the twelve-spoke wheel had remained in geosynchronous orbit over the equator and high above the ocean just outside of Columbia's international waters.

At any given time during the first five years, between twenty and up to over forty men and women worked in weightless and near weightless conditions until Tom installed a special ceiling-mounted system of mini-repelatron emitters that interacted with special underclothing—full neck-to-ankle body suits—woven with a special metallic thread the repelatrons pushed down on.

Since then, all but the central hub had been given gravity set to about eighty percent that on Earth. The hub, by agreement, had remained a weightless zone.

All that was about to change.

The hub—and the broadest parts of the spokes that actually had been the very rockets sent up to build the station—were fifteen feet at their widest/tallest so only one level had ever been planned or built. That height made the hub look large, but a lot of it was useless space, and Tom wanted to change that.

Now that manufacturing of the Swift Solar Batteries and many of the space observation functions were on the newer, *Space Queen* super station, it had left nearly half the spokes mostly empty.

Remaining, and by special request from all involved because of the stable position of the station, were the worldwide television and radio broadcasting facilities. Time, added channels and even Super High-Definition TV had taxed the equipment and at one time the entire spoke was replaced with a fully-outfitted new one when just about everything needed upgrading.

The time had arrived for another upgrade and this time it was going to require two additional spokes.

This was fine because Tom was taking up a brand new hub more than twice as tall and three times wider than before with the roof of the upper non-Earth-facing level being made mostly of triple layers of clear tomasite under which would reside a hydroponics facility that was fully automated and would work for the benefit of all.

With the increase in hub size came the opportunity to add four more spokes. It also meant their attachment points would be spread out enough he had added four new 3-man airlocks in the lower hub walls. Before that everyone had to exit and enter at the ends of most of the spokes.

The lower level of the hub would also be home to the six evac balls for the station, again keeping the crew from having to drag an injured person to the ends of several spokes.

Unlike the first time the station was lofted in pieces over a thirty-two rocket launch, four-month period and assembled by a team of men known as the vacuum monkeys, everything would come up in a trio of shipments, a day apart, using the giant cargo platform of Tom's heavy lifting ship, the *Goliath*.

Tom and Bud headed up one day early in the *Challenger* and readied everything. The three-day process required that all spokes be sealed so their air remained inside while the current hub was evacuated of its air using powerful pumps and a trio of special pressure tanks Tom brought with them strapped to the outer walkway of *Challenger*.

The current crew was in the process of transferring over to the gleaming, golden ship, *The Sutter*, that was generally "parked" two thousand feet away from the station. It would be their new home until work was completed.

"The plan," Tom was reminding everyone in an address over both the station's and *Sutter's* radio systems, "is to get the first shipment with the three hub rings up here, and that's tomorrow, then we assemble them a couple hundred feet off from the Outpost. The bottom and top rings come up sealed with atmosphere and everything installed, and the middle one, once everything is attached, gets the old air from the current hub before we open them to each other."

He went over everything else and asked if there were any questions or concerns, but received neither. He hadn't expected any from this professional crew.

On schedule, *Goliath* halted off the western side of the station and almost immediately the first vacuum monkeys swarmed her cargo disk removing straps and blocks and eventually lifting the first, or bottom, ring from its place. Then, using their rocket backpacks and a quad of small "space cycles," they carefully and slowly moved it into the construction position.

Two hours later it was joined by the middle ring and the team of "insiders" began hooking up winches and special motorized

blocks and tackles and started to gently pull the two pieces together. It was slow and tedious work, but precise alignment was an absolute necessity.

The team was skilled at their work. Before everyone took a mandatory two-hour break the first two pieces were not only locked together in perfect alignment, they were totally sealed in a manner that would require explosives to ever pull them apart.

When they came outside again, *Goliath* had dropped off the top ring and gone back to pick up new spokes one and two. They would return the next morning.

Work went even faster attaching the top of the hub and with the exception of removing the temporary seals where all spokes, old and new, would attach, it was looking ready to go.

The plan was to attach the first two new broadcasting spokes in a pair before any of the others from the existing station were detached and moved. As about ninety percent of the men responsible for moving and attaching spokes had been with the original construction crew, everything moved along quickly and without a major incident.

Only one new person, a former Army Sergeant, had a problem when her air supply was used up prematurely. She had been breathing fast in the excitement of what was going on. Luckily, someone else spotted the orange warning light on her backpack and got her back the *Sutter* in time.

The new people had practiced everything they needed to do and nobody made a false move or did anything to endanger themselves or those around them.

As *Goliath* headed down once more to pick up its last load and bring it to space, the original spokes were unlocked and unseated from the old hub, forced away using hydraulic rams brought up specially for the purpose, and they began to move in a slow train to the new hub.

Red Jones and Hank Sterling were piloting *Goliath* when it came back and both had a good laugh on seeing the station already built and the various workers lying around on the top of things as if getting in a little sun tanning time.

“Skipper? I know we’re an hour behind schedule, but you and the vacuum monkeys are making us look bad, like we’re holding things up. Send them over unless they are on a break!”

Three hours later the last spoke, one of the new ones, was in place and a team of men swarmed around each and every seal and joint painting on a special mixture that would show any

leaks.

The three they found, all pinpoint size, were sealed and the process of pumping the air back into the middle of the hub began.

What had made *Goliath* late was the wait for a set of new sealing plates that would be used to close up the old hub, provide one large airlock into it, and turn it into a new storage “shed” for the outpost. It was a decision Damon made not wishing to try to bring the old one back to Earth or to demolish it and crash it.

He’d also included one of Tom’s nuclear power pods to keep the old hub warm and the air circulating inside, air that would come up in the following weeks.

Tom and Bud stayed around until the following morning when the hatches from the spokes to the hub were opened and everyone went inside to check out the new facilities.

“We all know the word, but I’ll say it for us, Jetz!” Bud exclaimed on seeing the gleaming interior of the hub and feeling the slight breeze as oxygenated air from the already working hydroponics section above them began to circulate.

An hour later, when he and Tom departed, even the older, somewhat stale air from the old hub had a new vitality to it.

“They’re going to love it up here,” Bud said referring to the new scientific community spaces that would now be open as well as the tourist spots.

Tom admitted he was having reservations about opening the station up to the paying public.

“Your dad said he wants to institute a strict training and orientation program all people who want to go up must pass. Don’t cut the mustard and you get most of your money back and are turned away. People will sign on the dotted line stating they know this is not your typical island resort and they will toe the line. I think it will be fine.”

Tom nodded. “I hope so because Haz says if it works down here he wants to open a dozen or so spots to month-long tourists who are willing to work along side with the colonists as they enjoy Mars.”

The three-day working vacation in space helped Tom clear his head of a few things and he was able to focus on the important task of creating or finding a full-sized test aircraft. Whatever it turned out to be it needed to be flexible enough to accept several

different battery setups and even multiple power sources.

He sat down the day after returning from space and charted his best uses for several types of charging methods and ways to make power from the sun. Some, like the solar skin the plane would be covered in, were straight forward. But, not any one thing would give his plane the ability to generate power from the moment the sun rose until it disappeared behind them.

From sun up and for about two hours the solar rays would not be optimal for providing direct excitation to either Tommy's solar cloth or Enterprises' solar cell materials. That meant a couple hours of some sun that could not realistically be taken advantage of.

Tom knew he needed that lost power and had to come up with something.

At dinner the third evening he lamented this near set-back when Bashalli looked at him, seemingly amused by something.

"What?" he asked but her infectious smile got to him and he smiled back at her.

"Do you not remember that little light-powered toy you built for Bart?" she asked. It had been a couple years so he had to think back.

"Oh, right. The photon catcher, why do you—"

He stopped talking and his eyes glazed over. With a self-satisfied smile she got up, took their empty plates to the kitchen and got them into the dishwasher. Five minutes later she came out with two plates of strawberry/rhubarb pie and set one in front of her husband and one at her place. He was still "away" so she went to the living room to read a magazine on the joys of raising a baby girl while he was "gone."

Ten minutes later he appeared next to her and handed her a plate and fork.

"Got it!" he declared.

"Okay, and I know you once described to me how that thing worked, but please tell me again."

He did.

He'd created a light photon receiver disk that he'd placed inside of a short vacuum tube and that was attached to a powered swivel mount. The electronics made enough power to swing it around to always face the greatest level of photons. It would fill up the simple battery pack and drive around, always looking for a

source of power, and then keep the receptor pointed at the best source for as long as you let it. His idea had been to engage Bart and have him carry a flashlight around, teasing and attracting the toy to follow him.

Because it was self-centering it always provided the maximum amount of power. In the case of the little toy, that went to the wheels and three LED lights with the more power incoming the more of them lit up. Then, as maximum power was reached they would flash and a small audio chip would play a little tune, something that little Bart loved to see and hear.

“Fine. Now, if my memory is at all in good condition,” she told him, “did you not, way back then, tell me the receiver plate or disc or whatever it was you made could take in as few as just a few of those particles of light and sort of see them?”

“I did, didn’t I? I was right, and you are a genius for remembering that. Why did Bart stop playing with it, I wonder?”

She smiled. “It is because he figured out what it was doing, explained it all to his grandmother Prandit, and she could not understand it so he got discouraged thinking he was incorrect. I tried to convince him it was grandma P’s problem, but by that time he was looking through books about airplanes, jets and rocket and seemed to be thinking of bigger things.”

“I’m going to put together something that I once made for a toy for Bart,” Tom told Bud as they sat in the large office the following morning.

“Fine, so tell me what this wonder thing is all about and how it helps our solar racer plans, if,” he looked at his friend, “that is the intent. Or, is it for Bart?”

“It is for the solar project, so here goes. I call it a photonix grid, and it will be sitting right at the front of the wings so whenever we steer into the sun as it rises the pair of them will have maximum exposure.” He described how the photonix collectors worked by absorbing the light photons from the sunlight—or any bright light source—before converting them into electricity.

“It is sort of like a very sensitive solar cell, but not quite. It isn’t so good that we could use the generated power to run a light bulb to make more power, but it is very effective in sipping as much potential energy, electricity, from light as possible. In fact, within a few seconds of the sun rising just a tenth of the way into the morning sky, one receptor can be making milliamps and then



amps of power. All I have to do is devise a way to collect it in batteries and then we can use it.”

Bud pursed his lips and sucked at his teeth a moment.

“All right. I know it is more effective in low light than a solar panel, and so it will help, but is it better than a full panel in bright light and does it move with the position of the sun or remain stationary?”

“I’d say it stays in one place where it can do the most good. We can build a sort of lens to go in front and up over the top and direct light down to the plate so we can use it until the sun is starting to go behind us, but it will be most useful to start to refill the batteries as soon as any light is coming at us. It also is not as good as a solar panel once the sun is higher in the sky. It sort of clogs up with used photons. Not actually, but that’s the result.”

After a few seconds, Bud seemed to brighten. “Hey! Is this like those little glass bulbs with the whirling thing inside that spins under a light bulb or even a flashlight?”

Tom smiled and nodded. “Yes it is, except instead of reacting to the photons banging against the four-bladed spinner, those surfaces absorb the photons and react with an undercoating to create electricity we then collect.”

Over the rest of the day and for three additional ones, Tom worked to build his photonix catcher plates. His first plate, a three-inch circle of a crystalline material he made in a small furnace in his large lab was set behind the curved plastic lens he planned to place in the nose of the eventual plane. With all lights off and his blackout panels drawn over the windows he used night vision goggles to make certain nothing was reacting with the receptor.

Then, and minutely over a period of five minutes, he introduced first a few photons and then more and more until he was providing as much light as would come from the sun ten minutes after sunrise.

He watched as the power coming from the disc was fed directly into a small storage battery. It seemed to be taking everything the plate could put out and after twenty minutes he stopped to check the status of his power store.

“Well, that’s not very convincing,” he muttered on seeing how little actual power was available from the battery. He had been certain he was making enough to power a 3-volt lamp, but the battery showed a maximum voltage of just under 1-volt.

It hit him that trickling in the power probably wasn’t the best

way to charge the battery. The more you trickled in, up to a point, the more it sort of spread around inside the battery. What was needed was a way to *shove* power into the battery.

Explaining it to a curious Chow that lunch time he hit on the analogy of a glass and a dropper of water.

“Put one drop in an empty glass and swish it all around and it spreads out so much you can’t get any out to drink. Keep doing that and it takes a lot of drops before you get a small bit to pool so you can get it back out. The battery is like that. I have to pour the water in or at least splash a bunch of drops at the same time, not drop each one in and spread it around.”

Chow scratched his head and smiled. “Seems kinda like havin’ a canteen o’ water that’s pert near empty. It gets all hot and the water turns ta steam and ya can’t drink even a drop ‘o it until ya either put in more water or cool the thing down.”

Tom nodded. “A bit like that.”

Tom recalled his experiments with battery technology during the Electricity Vampire adventure and how he devised a way to slam a charge into a battery in moments rather than hours.

Two hours later he had a new setup in place and was getting ready to start the experiment again. This time, the difference would be in what the initial electricity did before going to the battery.

Even a few amps would be generated and those would be sent over to start filling up a special instant-release capacitor that would automatically discharge once it reached a certain level. That power, now amplified, would slam into the battery charging system where it would be joined by more and more capacitor output jolts. By the end of the day he knew a full-size system could provide as much as three percent of the total power his solar plane might use every day, building up a new charge every three to five minutes.

“That is half a percent an hour times the anticipated six hours of daylight they will be able to use starting at each sun-up. Three percent is a lot of power from a couple plates that will end up being about four inches tall and ten wide,” he told Hank Sterling as they sat in the engineer’s office.

“That’s pretty good, skipper,” the tall man complimented his your boss, “so why only the two small plates in the wings and one for the nose? Why not go whole hog?”

“Two primary reasons. First, once the sun is higher that about twenty degrees both the solar coating Jim English’s people will

be making and the solar cloth I'm hoping to use from my cousin in England will produce a lot more power. I don't want to take up too much space. I'm just trying to eek out any little extra bit I can.

"Second, the longer the photonix plates run, the less effective they get. They really need a period of darkness to slough off the old photons and get ready for the new ones."

When he mentioned the third electrical source to his father, the older inventor nodded and commented, "You will have a lot going on in the electricity end of things. Are you certain you can handle all of them? And, what happens if, in flight, one system has a problem?"

Tom looked at his father. "Well, I am hoping to make this fail-proof, but I should always have enough for an emergency landing. Unless Dianne and her team, with me helping where I can, can come up with a better, faster and more powerful electric-powered turbine that sips electricity, I'm going to have to carry as much power generating equipment as I can even if that means I carry a pocket full of nine-volt batteries!"



## CHAPTER 11 /

### CLOSE ENCOUNTER OF THE WORST KIND

DESIGNING THE basic aircraft wasn't going to beat any new paths between what was needed and what was already tried and true. In fact, about the only thing to be adjusted above and beyond the mating of a very good long-range glider and a small pleasure jet to be tackled were the wings. These would need to be shorter than a glider and swept more like a jet, but thicker in the middle.

Tom knew that unless he wished to hang the turbines outside the wing skin and live with the added resistance and drag, the wings would end up being nearly a full foot thick from the fuselage all the way out to at least twenty feet.

That made room for the turbines plus a lot of battery storage space.

The body would feature front-and-back seating to minimize the horizontal profile of the body, and would feature nearly identical instrumentation and controls. And, it was that instrumentation that gave him his first laugh of the day as he looked over the electrical needs of even his most sparse wrap-around monitor style panel.

"Wow," he said as he looked at the end figures. His father, at his own desk, looked up but could tell it had not been stated as a conversation starter, but more as a vocalized thought.

Tom looked up then over at his father in time to catch the older inventor's grin.

"Oh, hi, Dad. I was just looking at all the power consumption we have to deal with the power going to the dual instrument panels. Unless I can figure out a way to cut the power use by half and then pass the panel back to Bud and then back to me when pilot switchovers happen, I think I may have to go back to a mostly analog set of gauges."

Damon made a "let me see that" motion and Tom brought over a piece of paper he'd been jotting figures on. "Hmmm? It certainly looks like you'll either have to figure in an additional three hundred watts of power per hour per panel, or go the old fashioned route. What is your gut telling you?"

Tom grinned. "Tried and true even if it adds an extra seventy pounds or so to the plane. I'm going to see if I can make a swing over mount so we just need the one set, then on swapping

positions it pops up and can be pushed over the first seat and snaps into position back behind.”

When his father didn't comment, Tom looked at his face, a little worried he'd forgotten something. Then, it hit him.

“Oh, and for safety the back or front pilot can command the panel to move to their position or at least come up off its mount and far enough up to be grabbed and manually swung into the other position.”

Damon now smiled. “Exactly what I was going to inquire about, son.”

While they agreed it was far too early to build the actual aircraft, Damon suggested purchasing a used glider and adapting it to be a test bed for Tom's development. The younger inventor eagerly agreed to look into it.

Within a week Tom found fifteen gliders, all within the size and style he wanted, and all for great prices and all within about ninety miles of Shopton.

Four had taken small wing damage during landings and had been repaired but had not managed to pass their flight certification exams. Those came off his list.

One was actually two separate gliders that had been welded together when the front end of one had been crush on a bad nose-in landing and the other had its tail ripped off by an out-of-control private plane being taxied by a failing student pilot.

Of the remaining ten there was nothing truly wrong with any of them so he chose to go see the two at the Shopton Regional Airport first. The first one made him chuckle as he recognized the impounded aircraft of a man who once forced the pilot of another glider to crash on the east side of Lake Carlopa. It still sported the paint streak on its left wing where that man had flipped the other over.

The other plane was in pristine condition and when the man who owned it arrived to talk to Tom about it he could only shrug when asked why it looked so new and yet was so cheap.

“I bought that with some of an inheritance I received two years ago. That was before I had a certificate and even more so before I realized that flying makes me insanely frightened. I took it up once with an instructor in the back, panicked, and had to be pried out of the cockpit. As soon as I could I arranged for it to be put back in its storage box and trailer, and then parked it over here.”

Tom inquired if there was any way he might give it a try.

“Sure,” the other man, Jamie Stokes, told him. “Just as long as you don’t ask me to go up with you.”

They arranged for a tow plane and Tom handed him his car keys. “Collateral,” he explained before the man flipped them back to him.

“Heck, if I can’t trust Tom Swift to bring back something I never want to see again, who can I trust?”

The fifteen minute flight went very well with Tom finding a nice thermal just to the east side of the lake and riding it up nearly five thousand feet before making a wide and lazy spiral back to the airport.

They haggled with Tom finally convincing the man to take more than he was asking.

“I really want you to feel you didn’t give the thing away, Jamie. So, even at twice the price you’ve asked I’m still getting a steal. Are we both happy?”

Both men were and so Tom made a call and asked Deke Bodack to fly over with a *Pigeon Special* and a tow line. And, because Tom knew most of the adaptations would likely take place at the Construction Company he radioed them and arranged to land on their runway behind the manufacturing buildings.

Deke also landed a few minutes ahead of Tom so he could fly them both back to Enterprises.

Three weeks later the Gunderson AG-100 had new wings complete with the first version of the turbines Tom intended to test the airframe plus a moderate solar battery power pack nestled behind the second seat to provide the power he needed. There would be wing battery packs and a solar collecting charging system in the leading edges of both wings to give his some test data, but the turbines would not use that power.

Tom and Damon were sitting with Bud having lunch when Trent stuck his head into the office.

“Tom just received an email I’ve routed over to Harlan Ames’ people. Rather than add his electronic signature to it I printed it out. You all need to take a look at it.”

He came in and handed it to Tom. The young man read it, groaned and handed it to his father. Likewise, Damon made a

noise, more a grumble, before letting Bud look.

Tom Swift

Back off from the contest! This is your one and only warning. Fail to cancel plans and you will die! Announce that you are forever leaving the contest in the *New York Times* by this Thursday.

A Friend

Bud snorted. "Some friend!"

The intercom pinged. Bud reached over to the device on the conference table.

"Harlan is on his way over," their secretary stated.

Four minutes later the Security chief came through the door, slightly out of breath.

"You've all read it?" he asked taking a seat and accepting a glass of water Tom got from the side table. "Thanks!"

"We have," Damon spoke for the three of them, "and can't figure out who would be doing this. I mean we can get the list of entrants from the X-Prize committee and turn those names plus the note over to the FBI and they will make things uncomfortable for all. And if this is not an entrant, then the whole why of it eludes me."

Harlan nodded. "Phil and I had a very brief chat about this and we both have the gut feeling it is not from an entrant to this contest, but that is as far as we got. No indication to go on if this is an old score someone is trying to settle, a crackpot out to try for fame or, if we get some sort of payment demand, fortune, or even one of our old enemies. I can think of at least one foreign power not very happy with us after the whole electricity stealing airship thing."

That was something all three had come to their minds almost immediately on reading the note.

"So," Harlan said to them, "this is Monday and the note mentions Thursday, but not the morning or evening edition. I would ask that you go ahead with what you've planned for today through Wednesday up to about midnight. Perhaps we or the FBI can find out where this came from in the meantime."

Tom nodded. "That's good because I want to take up our reconfigured glider on Wednesday for a test of her turbine flight systems."



“I heard everything you said except for the name of the pilot who will not be either Tom or Swift,” Harlan told them, quite serious.

Bud told them, “Sorry, but it can’t be me. I’m committed tomorrow through Friday to be out in British Columbia at the factory where that deadly little helo comes from. They want me to be part of the accident investigation panel and design autopsy effort.”

Damon picked up his tablet computer and found the file he wanted a few moments later.

“Well, Red Jones is up at the *Space Queen*, Slim Davis and Art Wiltessa are at the old Outpost as they get things set up in the empty spokes so we can accommodate more residents and visitors.”

With the decision to keep the old station in place—other than the offset of about three hundred feet from the old hub—plus the added spokes, a few other decisions had come up. One was from Doc Simpson who asked that the sickbay, now barely the size of a small walk-in closet, be moved from its spoke location to the bottom deck of the new hub.

“It’ll make loading anyone into an evac ball a cinch and could save lives,” he’d argued. It wasn’t something planned but a large storage room down there was being repurposed and the old location would now be used for food storage as it sat near the kitchen.

“Well, that leaves Deke and Zimby from the A list,” Bud stated. “And, I’m afraid Deke is not a starter because of his height. I’ll drop by and ask Zim his feelings if you want me to,” the flyer offered.

When he did, Zimby jumped at the chance. “Golly,” he said, his eyes going bright, “It’s been almost a year since I got to solo in a glider. But, I guess this is no longer that, huh?”

“Not so much, Zim,” Bud told him. “However, she ought to scoot through the air at more than three hundred knots if Tom’s got everything dialed in. And, before you ask, I’ve got no inside info for you. I haven’t been in so much as the cockpit myself. You’re to be her first.”

Zimby spent Tuesday over at the Construction company and even took the tow back to Enterprises late that evening. The controls were all manual with no electrical or hydraulic assist, so things needed a bit of muscle to make it turn and nose up or down slightly, but it was about the same thing in a *Pigeon*

## *Special.*

Wednesday morning Tom met him in front of the Barn where he went over a few things Zimby may not have known or guessed.

“The yellow T-handle is a multi-function device. As it is set now, it is the tow rope release. But, turn in ninety degrees clockwise and it is set to be your safety chute handle. It will be like that in whatever we eventually produce, and perhaps even in a few weeks for this one that will all be automatic and controlled by the main computer.”

It had been decided to not test the ability of the turbines—that Tom were certain were underpowered—in take-off, but to tow the plane to about five thousand feet before starting things up and dropping the line.

This time, that tow would come from a *Pigeon Commander* with Tom at the controls. Assuming the new craft Tom kept thinking of as *Gunderson* could make the speed technically possible, the tow plane would be more than sufficient to become the chase plane.

With him—to operate the camera and also to watch the readouts from the power plant and turbines—was Artie Johnson from Propulsion Engineering. As long as Tom kept them behind or directly to the side of *Gunderson*, and slightly below its flight altitude, he had a perfect and unobstructed view.

They rolled out at the full tow length of eight hundred feet of line and headed for the closest north-to-south runway with the rebuilt glider tagging along like a faithful dog on a leash. That runway would be closed to all other traffic while Tom got Zimby to altitude and then made a sweep back the length of the runway to drop the line for recovery.

“Ready, skipper,” the pilot reported.

“Just getting permissions, Zim, hang on...”

Takeoff permission was given seconds later and they started their roll.

As they rose through one thousand feet Zimby radioed he’d just started to bring the turbines up to idle speed. At three thousand he reported he was needing to use a small amount of the air brakes to keep from having the tow line go slack, so Tom sped up by fifteen knots.

And, at five thousand, Tom prepared for Zimby to release at which time the *Commander* would go full throttle and shoot ahead to keep the line from whipping anywhere close to the

*Gunderson.*

On cue, the line released, Tom moved ahead and made his turn to reverse fly the runway, and Zimby began having a really fun time flying.

Coming back around and gaining altitude Tom put them three hundred feet below and a thousand feet behind Zimby's aircraft.

Artie called out the first results. They were good. Not great, but more than adequate.

"Thrust nearly even. Eleven-fifty pounds from port side and eleven-thirty-six starboard. Temps on the cool side for now. Can we have him turn into the sun to see what is coming in via the photonix plates?"

Tom made the call and Zimby acknowledged it, asking for an additional forty seconds at his current heading before turning.

"I'm adjusting the tension of the elevator cables, skipper. Not a biggie but I think it will help with control reaction."

When he did make his turn it seemed to the inventor the plane came around faster than the three earlier turns so he made a note on his check-off list.

What neither pilot saw was the other aircraft that practically paralleled them about twenty miles to their east. There were just enough hills between them at the present altitude of six thousand feet to keep the new aircraft hidden. And, had it been a matter of only the old, lower aircraft control tower in the middle of Enterprises trying to keep a RADAR eye of everything, the other craft would have been missed. But, the new tower up on the hill overlooking Enterprises picked it up and radioed Tom.

"Skipper? Unidentified contact, no IFF squawk, on zero-nine-two degrees true. It was twenty miles out but is drifting closer at about a mile a minute. We've tried to warn them off but they don't respond. Can you both come back until we figure this out?"

Tom was about to reply when Zimby beat him to it. "Negative on me. My adjustment is slipping and I can't get enough good angle to cinch down on the screwdriver. Give me five minutes and I'll come about no matter what. Sorry, skipper."

The two aircraft continued their mostly southerly course but Tom suggested they gain some altitude in case maneuvering was necessary to avoid a problem with what might just be a nosey private pilot or even a nosier reporter trying to get pictures of another Swift aircraft.

Four minutes later Zimby announced he had things re-

calibrated and tight and would start his port-side turn. At that moment, too fast to be a coincidence, the other aircraft made a sharp turn and soon shot past them both to their south. It was still curving back to the north as they straightened on their course back to Enterprises.

“Got her at full throttle, Zim?” Tom inquired, this time using his TeleVoc pin as he assumed the other aircraft was actively listening in on their radio frequency.

“Sure do, Skipper. Permission to go even higher? I’d like to operate this in glider mode in case things get hairy. I can fly a lot slower than they can and outmaneuver them no matter what.”

Tom told him to go as high as twenty-five thousand feet.

The *Gunderson* climbed steeply up and away while Tom sought to find the other aircraft, one he had seen was a private jet with no markings—never a good sign—on its first pass. When he finally spotted in on the *Pigeon’s* RADAR he groaned. That pilot was climbing up to Zimby’s level making it perfectly clear he or she didn’t care about Tom’s aircraft as much as they did the *Gunderson*.

As he pulled up both he and Artie spotted a lance of light shooting from the front of the jet and straight into the front of the *Gunderson*.

“What is that?” he demanded from Zimby.”

“Some sort of laser, I think. Hit the right wing and I’m getting nasty readings from that battery pack. Must have hit right in the photonix collector and overpowered things.”

The enemy jet made a sharp turn and came around for another strike.

Tom was at a disadvantage. Had he brought an SE-11 jet, like his Toad, he could climb as rapidly as that jet. But, he couldn’t so it was about ten seconds too late that he got to the *Gunderson’s* altitude. He was in time to see the right wing expanding before it suddenly split open and the entire outer twenty feet snapped off and went spinning back behind the aircraft.

Zimby would be fighting a losing battle now as the aircraft started to spin like a maple seed with the one intact wing pointing up and out. *Gunderson* was making about one complete spin each five seconds and the only good Tom could think of was it would not be so violent as to render him unconscious.

He tried the radio before giving up on that and tapping his TeleVoc pin.

“Can’t—spare—time—skip—” and the communication was cut.

Next, Tom let out a sick groan and Artie a scream as the other wing, overcome by the spinning stresses, tore away sending the fuselage into a steep dive.

As they both watched in horror, the spinning became noticeably slower and the nose began to come up a little. It was perhaps up by ten degrees, but even non-pilot Artie knew there just wasn’t enough air under the stricken craft to pull up all the way to level flight. But, even then it would not be capable of flight.

Tom made a radio call that nearly sickened him. “Test plane tearing apart. Pilot may no longer be able to get out. Get the recovery helos in the air.”

*Gunderson’s* nose kept coming up bit by bit but she was only eleven thousand feet above the terrain now. Even a controlled crash would be better than a nose-in, and if Zimby could make it one more mile to the southern end of Lake Carlopa—

Now trying to come up from his own power dive, Tom was fighting the controls of the *Commander* when he lost sight of his friend, employee, and a man he looked up to as he and Artie overshot the plummeting aircraft.



## CHAPTER 12 /

### PROTONS, PARTICLES, WAVES AND OCTAVIA

WHAT NEITHER Tom nor Artie caught was that Zimby had managed to manhandle the nose up to near level flight and then finally released the emergency chute at just two thousand feet above the lakeshore. It billowed out from its compartment just behind the rear seat and opened fully before the aircraft got below one thousand feet.

It was not steerable and so wherever Zimby landed would have to be fairly soft to be survivable without injury.

Tom turned them back to the south in time to watch as the fuselage splashed down in the water some one hundred feet from the south end of the lake. It was, he knew, only about eight feet deep at that point, so assuming Zimby was not unconscious, he should be able to emergency blow the canopy and get out.

He brought the *Commander* lower and lower until he finally was flying a pattern of one-mile diameter at about the slowest speed possible. Inside they could see the pilot moving which gave Tom such a sense of relief he thought he might pass out.

He didn't, but also Zimby wasn't getting out of the crashed aircraft.

"Tom to Tower. He made it!" The relief in his voice was almost overwhelming and it took him another half circle to get any other words out.

It took more than five-minutes for the canopy to open and for the pilot to climb out, now sitting astride the midsection of the plane's body as the *Pigeon* passed overhead for the eighth time.

He waved one arm overhead and Tom thought he could see the other sticking out and behind at a strange angle from the flyer's body.

"Send the rescue helos out with Doc or other medical personnel for possible dislocated arm. Also bring down a heavy lifter with a sling and team to pick up what is left of the aircraft—mostly fuselage including full tail section—for return to home."

He tilted and waggled the wings as he flew over Zimby to let him know everything was being handled for his rescue. Then, as he made another sharp turn, the crashed pilot finally used his TeleVoc to contact Tom.

"Skipper? Sorry about shutting you off before. I just figured it

wouldn't do anyone any good to hear me if—" and his voice, even the electronically duplicated one of the communications pin, choked on his emotions.

"Say no more, Zim. Glad you kept your wits about you and got the nose up."

He heard the return laugh. "Glad the other wing finally broke away or I'd never have set down like a butterfly, skipper. Seriously. If it stayed attached I'd have gone in hard. Also glad the tail remained on so I could use the elevator to trim the nose enough to stabilize and get the chute deployed. Uhh, when is someone going to get here? I seem to need a bathroom all of a sudden and my arm is killing me."

"Ought to be overhead in three minutes. Hang on."

Twenty minutes later, Zimby came out of the restroom in the Dispensary and took a seat on the exam table in the first emergency cubicle. Doc and Debbie checked him over before suggesting at least a SimpsonScope scan to check for anything internal.

"By that time the meds to numb that left shoulder will take full effect and we can ease it back into the socket," Doc told him.

Zimby smiled and then tilted his head toward Debbie. "Can she do the work? She has softer hands than you do, Doc."

"Sure, and her with a new boyfriend and you with your new girlfriend down in Washington, and—need I go on?"

The arm, with both Doc and Debbie working on it, popped back into place and was soon bandaged across his chest.

Two days later with every part of the aircraft recovered Tom took a look inside the leading edge of the wing that failed first. The photonix collector, usually an unnaturally shiny black color, was dull, scorched, pitted and bubbled. The initial point of "impact" was just an inch wide and had quickly traveled around had set off a chain reaction. The collector was overpowered, it send far too much power into the circuits first causing failure in the battery pack and then great swelling in that same component.

In seconds that split the wing open and the jagged edges caught the air and it was ripped from the plane. The other one would have been certain to fail at some point; fortunately for Zimby it parted company with the rest of the plane when it did.

Along with the aircraft's *post mortem* came word through Harlan that the jet responsible for the near fatal crash had been located at a small airfield in Pennsylvania, abandoned. Inside



was a mount for what must have been the high-powered laser they used to damage the *Gunderson*.

And, even without any external identification numbers it was soon identified as a corporate jet reported stolen in Canada two days before. When Tom read who the owner was he shot to his feet.

*Whitcomb Aeronautics!*

Tom busied himself trying to find more ways to do what his son, Bart, had once said; he had to squeeze the sun for more power.

Anything he might be able to add that didn't burden the airplane with more than a dozen or so pounds of weight, or that took up more room than a few square feet—not that the space available was square!—ought to help.

Right as things stood, he could see the aircraft flying just below the necessary speed to achieve the around the globe trip in thirty-six hours and have at least an hour of reserve power as they flew into the rising sun after the night cycle, or they could fly at the bare minimum speed to win and go into about ten percent deficit. That would mean they would fly fast until about twenty-six minutes before gaining the sun they desperately needed, and gliding during that time.

It would be a downward glide and could put them in jeopardy of flying below the minimum altitude limit.

Harlan called the main office and asked if he might come over to talk to both Swifts. Ten minutes later he arrived along with a folder holding about a dozen color photographs. He sat down and was joined by Tom and Damon.

“For starters, this is about the biological attack out on Fearing. If you will both recall my initial thought was that this was launched from a diver or even a remote controlled model boat. Well, we found out a bit more yesterday when two of the technicians—young love in the making I hear—were strolling down near the beach on the island's west coast. They found this.”

He opened the folder and pulled out the first photo. It was of the crumpled wreckage of a model rocket. There was nothing to give any scale, so he pulled out photo number two that had a ruler next to it.”

“So,” Tom said, “that might have been about two feet tall

originally?”

Harlan nodded. “Yes. And, about one-inch wide. Inside it had signs of having had two rocket engines stacked atop one another. The first one would have been kicked out the back by engine number two firing, and that was far enough up inside the tube it scorched nearly through it as it burned. But it, too, was ejected and we believe that happened over water.”

“Tom?” Damon asked, “How far would that possibly have traveled? You have the model rocketry experience.”

“At a guess I’d say it could not have risen much more than a thousand feet and maybe came over at an angle of fifty or sixty degrees. That would have put it only twelve- or thirteen hundred feet off shore, which means it must have come close using a quiet model boat.”

“Our supposition as well,” Harlan verified. “No guidance, of course, or other electronics, but this sort of weapon isn’t one of precision delivery. This was just a transportation vehicle for this,” and he pulled out three more photos. Each one showed various thin pieces of what looked like glass.

“That was a vial with about two liquid ounce capacity,” he told them. “We managed to get everything gathered up when our technicians called in the suspicious materials they’d spotted. Very careful handling got a lot of the vial put back together and it obliged all that hard work by giving up two very nice fingerprints.” He was now smiling.

“Could you get an ID from them?” Damon inquired.

Harlan now nodded, but also shook his head a little.

“Yes and no. Both the FBI and Interpol got back to us with an identity of a wanted felon named Shieler Glodis. Formerly Ukrainian and more recently a suspect in a murder in Brazil. The thing is, there is no such man that can be located today. He either disappeared or changed his name, but he is missing.”

Seeing a smile playing around the Security man’s lips. Tom asked him, “Why do you seem a little pleased?”

“It might be because I have a bit of cop’s intuition about him. The closest person I could find reference to, with some great help by a former colleague, is a Skylar G. Dale. He came into this country about a month after Glodis disappeared. I’m thinking the G stands for Glodis and Skylar is pretty close the Sheiler.”

He looked to see if they agreed with him. Both men were nodding thoughtfully.

“I’ll keep on this, but for now rest assured the biologic agent has been identified and a cure is available. Simple injection of ephedrine and an anti-nerve agent does the trick in about ten minutes. Then, whoever has been exposed has a pretty good immunity to it.”

The second gathering of entrants for the Solar X-Prize took place sixty days after the first one, with a change. Only the primary pilot needed to be in attendance, although both—or in the case of an entry from Russia, three—pilots were invited. This time, and because of the financial burden five of the foreign builders claimed it was imposing, the Diamandis Group had authorized each team’s travel be underwritten up to one thousand dollars.

The two entries from California had nearly zero travel expenses so they gladly tossed their money back into “the pot” so the people coming from the farthest might have a slightly larger gift coming their way.

Tom and Bud did the same and offered to ferry an entry from Florida. Being a college team they had little funding outside of what they could make with baked goods sales, crowd funding and other private money begging, so they jumped at the chance.

As they admitted it was both a money thing plus the added attraction of getting to spend time with Tom Swift! At least, that was the attitude of one of the young women—Allison Murchinson—who would be the main pilot in the only all-female team. The other girl—Helen Beacher—seemed sulky and greatly bothered. When Bud asked her why she was so glum, she glared at him.

“Well, you’d be off your best ‘smile for the nice people who are going to trash you,’ if your entry was all for nothing. Of course you two are going to win. It isn’t fair that you have all that corporate backing. I thought this was supposed to be a *privately funded* contest!”

Tom placed a hand on his friend’s forearm to forestall him from answering.

“Helen,” Tom began, “can I ask you why you believe we are not working within the rules? I only ask because every bit of the development costs and the build cost is coming out of my own pocket. This is not being underwritten by our company or my father or anything.”

The girl slumped father into her seat. “Yeah, you’d say that, wouldn’t you?”

“Helen!” came the sharp rebuke from Allison. “Tom is being really nice and flying us out for free. The least you can do is be civil!”

Tom came to the dissatisfied girl’s rescue. “Not at all. It is a legitimate question even if asked more as an accusation. So, Helen, even though Swift Enterprises is a great big multi-billion dollar company, the fact is I have a budget of just one hundred and fifteen thousand dollars to build my aircraft.” When she snorted her disbelief, he continued. “It is true that the money is just for the actual build and not for any experiments, and that at least one component of our recharging system is coming from England and they are paying the shipping, this is entirely a ‘Do it on your own’ project as far as the company is concerned. Of course I have experts to talk to and an in-house team who will build my turbines, but the plane Bud and I will fly is not sponsored at all.”

He wasn’t certain if he ought to press the issue, but forged ahead anyway.

“Can you say the same thing about the plane your team is building? The one with the great big corporate logo on the sides and the name of that famous shipping company on the underside? The ones who have each given the college more than one hundred thousand dollars for your project just so it can have their names on it?”

Alison giggled. “He’s got you there, Helen. As it is we’re going to have to give that money back. The school should never have accepted it. It’s against the rules, but we still have about what Tom is spending.”

Helen said no more but they all knew she wasn’t convinced.

Tom set them down at the Burbank Airport, parking at the right side of the main runway near the small private terminal.

They were taken to a waiting room until two more entrants arrived in the next half hour, then all boarded a small tour bus and were taken to the offices.

As before the conference room was waiting but this time was only about half full when Rebeccah Speers walked in to greet them. Over the next four hours she told them of the next steps in the overall process including the two site visits by the committee to look at their aircraft, check for adherence to the rulebook, and to give helpful hints in case they were required to keep contestants from heading off in a wrong direction.

Tom noticed that Octavia Dale was sitting by herself about as

far away from him and Bud as possible, and that she made no sounds at all during the rest of the day.

Rebecca called a halt for a mid-afternoon snack, and said each entrant would be asked to come into the side room for about ten minutes for a private consultation.

“After you finish you may hang around here if you have a flight out tomorrow—we’ll have a small dinner brought in, or you can go ahead and get back on the bus. It’ll take trips over to the airport about every thirty minutes. And apologies in advance for rearranging things a bit, but we did so, so our visitors with connecting flights out of LAX today can get there and head home. Can I have our friends from Taiwan come in after you’ve had fifteen minutes to grab something to eat?”

As they sat munching on a couple lukewarm cheeseburgers, Tom and Bud were talking about some of the things they’d heard in the previous hours. And, about the mysterious and angry Octavia Dale.

“Given how warm she seemed to want to be with you first time you spoke with her, I’m wondering if maybe you ought to change to a new deodorant, skipper,” Bud said with a grin. “She really has changed her tune. One might even say she actively and outwardly seems to hate you... and me for that matter.”

Tom finished chewing his latest bite before answering. “She really doesn’t strike me as the sort of person who is ever actually nice. I’d say she’s more of a user and abuser to get what she wants. She’s a bit like an animal I remember from third or fourth grade. It sits there all soft and fuzzy looking with what seems like a sleepy grin on its face until its prey wanders too near, then it strikes faster than a snake. Vicious attacker, too.”

Bud nodded. “Yeah, that would be good, old Octavia. At least this time she didn’t come too close. Personally, I would not want to face her in an alley, either happy or angry.”

Ms. Dale was called before Tom and Bud, and when she left she had a determined but slightly angry look on her face. She even shoved past Helen and Allison who would be going in right after the Swift Enterprises team.

“Geeze! What a rhymes-with-itch!” Helen said as the Canadian disappeared through the doors.

Bud leaned over and said, “She does sort of give you the impression there is nobody else as important as she is—at least in her own mind.”

For the first time that day, Helen smiled at him.

“Come in, Mr. Swift. Mr. Barclay,” Rebecca invited them as she stood up to shake their hands. “I must say there is a lot of chatter and questions regarding whether we ought to allow you to be part of all this, but as I’ve told them, until we hear differently, we go on your entry statements and those say you are not being funded by the company.”

“No, ma’am,” Tom replied. “I have an annual budget plus a contingency fund to do everything from fund science programs in high schools to secretly, and privately, funding a few choice science and technology-related projects out there. I have a small amount left at the end of last year and am using that rather than taking it as a bonus. I’m sort of hedging a bet with it that I can win and therefore take the prize money and do a lot more good with it.”

She nodded and looked down at her clipboard. “I see here some special and anonymous funding going into the Central Florida Technology University program that is building one of the entries for this contest. Hmmmm?” She looked up into his blushing face. “You are actively funding a competitor?”

Now, Bud was looking at his friend. Allison and Helen were members of that very university team.

“Yes. Just before I decided to toss my hat in, so to speak, they sent a request to our charities group asking for some money for a project they hoped would bring them monetary rewards. Even if they do not win, I feel it is money well spent as it gives a team of about fifty great kids the chance to really stretch themselves and learn a lot of great things along the way.”

She changed the subject and they discussed any concerns Tom or Bud might have along with being provided a new list with five radio frequencies that would be used for various things before and during the race, and a chart of the course they needed to take to stay within the limits of the rules.

As they passed the two girls going in, Bud turned and looked at them. “If they only knew...”

“Which they will not, Bud. Understand?”

Bud nodded his head but believed it would make a great movie scene if and when Helen found out the truth.

Nothing more was said about the contest on the way back to Florida where the girls were let out at the small Ocala International Airport at about ten, local time.

Allison thanked them both with hugs while Helen held out her right hand but only long enough for a single up-and-down shake

of both their hands.

“She’s not generally like this,” Allison tried to explain. “It’s just that she doesn’t know, and I swore to not spill the beans on our funding angel.” She went upon tip-toe and gently kissed Tom on the cheek. “And, she and the others never will hear it from me... Angel. Bye!”

“Well, how do you like that?” Bud said with a chuckle. “How’d she find out?”

“She’s the Dean of Special Studies’ daughter, flyboy. I’ll bet she hears a lot of things over the dinner table at home that she keeps mum about. Come on. Let’s get home.”





## CHAPTER 13 /

### THE DEVIL'S AIRCYCLE

DESIGNING AN aircraft was a simple thing to do, if you knew what you are doing. Tom did. And so, the near-final shape of his solar entry electric jet came together far in advance of his ability to shove it through the air as fast as he needed to go.

Even with the design nearly ready he was left with questions about power and thrust and all the things that needed to carefully balance—with a bit extra of each for safety—before he could build the final jet.

“How do you plan on testing those things, son?” his father asked. “Obviously you can put an aircraft in the wind tunnel and even do some static mount testing of the turbines and batteries, but I know you and you are less likely to do it that way than I am to get up and begin a revival of disco dancing. So?”

Tom smiled at his father.

“For starters, Dianne Duquesne and Artie and those folks have promised to have a new, higher-capacity electrical turbine soon, as in one week. Same size as before but they’ve upped the rotation speed, added a Venturi-defeating set of interim mini-vanes and say it is now too strong to be used in their test chambers. I plan to repurpose one of the little air-cross racers to remove the current jet turbine and fuel tank, and put in batteries and this new electric unit.”

A few years earlier a wealthy sports promoter out of Las Vegas had Tom construct a small number of what he termed, “jet powered motocross racers of the skies!” And, while his racing league lasted only a couple years the design had been repurposed for at least two projects to provide light, moderately portable and flyable by nearly anyone single and two-place aircraft for everything from reconnaissance to rescue.

Australia had nearly five hundred of them and Mongolia, with its giant Gobi desert had about a hundred used to patrol their national borders and to rescue tourists who would otherwise perish from their foolishness in the desert.

“I see. What sort of performance do you anticipate?”

Tom shook his head. “Don’t know right now, and that’s why I’m having Hank Sterling and Arv Hanson tear one partially apart and rebuild it with a quick-opening side hatch and a series of insertion points for battery sets. They’ll be mounted in cases

that simply slip in and lock into place, and the next time the jet is turned on the computer sees them and recomputes all the power parameters.”

Damon nodded. He knew his son and knew Tom would want to take the first rides on this little pocket jet, but he had another pilot in mind.

“You will, of course because you are a smart young man and a father of two children, be giving the testing duties to one of the men we have hired to do such a thing. Right?”

Tom rolled his eyes and sighed, then realized he probably looked like his sister, Sandy, and he stopped.

“Yes, I know it ought to be that way, but it’s a tried and proved airframe. Besides, all testing is going to be out over Lake Carlopa in case of an accident.” Seeing his father wasn’t the least bit convinced, Tom shrugged. “Not working?”

“No, not so you’d notice, son.”

“Okay, but after the first few tests I get my ride. I need to feel the response, not just get a two-dimensional written idea.”

Over the next week as Hank and Arv did their work, taking turns making new or updated parts for the little jet, Bud gave into his old habit of naming things.

“Tasmanian Air Devil,” he said looking at the reddish-brown fuselage. “Flies like a bat out of you-know-where with all the genteelness of the aforementioned wild animal.”

Hank threw an old rag at the flyer and Arv picked up a small pipe and threatened to chase the young man from the workshop where they were doing all the work.

Bud skedaddled but not before TeleVocing Tom and telling him of the new name. “Arv and Hank seemed really impressed by it,” he said deciding to not tell Tom what sort of impression the name had made.

The matter was dropped when Bud also told him of the progress they had been making. “Hank says they are two days ahead of schedule and will be calling you later today to tell you when they believe I can fly her.”

“And, who says you get first crack at the new jet?” Tom asked innocently.

Bud sputtered and tried to form coherent words but his brain and mouth failed to get together. Finally he managed, “But, I always get the first flight, I mean, your fath—” and he stopped

knowing it was an old story to Tom.

He and the other test pilots were hired with the expressed idea that they were, ultimately, expendable and *Tom was not!*

“Don’t worry, Bud. You get her first, then Zimby wants to give it his special testing and then I get a chance, but not before you two put about twenty hours on it. You guys are testing for airworthiness and I will test for speed and power consumption.”

When the call came from Hank he said mostly what Bud told the young inventor, except for the timetable.

“Whoever is flying her first can come by tomorrow about mid day and get a chance to see what is new. Because of the increased speed it will have a beefier semi-canopy that covers the top half of the pilot, a three-point hold down for the harness instead of the one-point it used to have, and a few other refinements. Come on over then yourself but how about a preview look at eleven?”

Tom promised to be there at the earlier time.

When he arrived it was to watch Arv carefully fitting the new and sleek canopy cover to the hydraulic struts that would raise and lower it.

Tom walked over and ran an appreciative hand down the nose. It, too, had been replaced with one that was pointier than the rounded one from the original aircraft. He also noticed as he walked all around it the wings were a little thicker, deeper by about six inches and possibly two feet longer but more acutely swept back. The small wing tipettes that once had been such a problem on another aircraft that one actually ripped off in mid-flight were now taller and noticeably thicker.

What intrigued him most about them was they now appeared to have small rudder-like bits at the back.

“Like the high-speed rudder-ettes?” Arv asked with a big smile. “Hank found that the faster you want to go, and we both know you do want to go fast, the less effective the actual rudder at the back is now that we have the pilot canopy. Too much air flows up and over. It gives more lift but cuts down the effective area of the rear rudder.”

“And,” Tom said as he moved the right one back and forth a little, “these help give back that control?”

Hank came over shaking his head. “No. They don’t *help*, they completely take over leaving the tail to do its ‘keep the plane pointed straight ahead’ thing. These take over and actually swing the plane left and right at the center-point giving better

performance overall.”

“Oh,” was all Tom could think to say.

When he saw them an hour later, Bud said, “Won’t work, you know.”

Hank, a good four inches taller than the athletic six-foot pilot, rested an arm on Bud’s shoulders. “It will, you know. And, I will also have you know you will come back from your first flight and give me twenty dollars you will be so impressed and regretting your previous statement!”

Zimby took a look at them, moved back to the front of the plane and closed one eye looking right and left at them, eventually holding up his right hand, fingers up, as a vertical divider down the center of the jet.

“How much do I have to dial things down to keep those from spinning the jet?” he asked.

Arv responded, “The computer judges what you want, what the plane is doing, and sets limits. Technically you can spin this around in mid air and go on your merry way, but we both think that is too dangerous. We have it set for ten degrees of turn each second. Once you’ve both flown it, and even after Tom has his input, we’ll adjust it to what everyone thinks is best.”

All three of them got the chance to climb on, hook their harness to the cables and lie down. It was Bud who first noticed his feet now could be slipped into recesses in the sides and no longer rode on flip out pegs.

“Is that to keep my legs from being torn off?” he asked with a grin.

Hank and Arv did not grin as they nodded.

“And,” Hank said, “please notice your arms don’t dangle out over the fuselage any more. They slip into those holes and move the controls inside, away from the wind. The pilot will feel some of it beating on his backside, but nothing will come loose and get damaged, body part wise.”

Tom laughed as Bud looked at both his hands and arms. “Thanks, guys. Sandy would never forgive Tom if this thing made it so I can’t give her a good hug.”

With a shake of his head, Tom stated, “Tom had nothing to do with those things. Hank and Arv are looking out for all our skins so let’s give them the big thanks and acknowledgement of great work.”

The following morning Tom, Bud and Zimby met the other two out at the Barn where the new electric turbine aircycle had been positioned.

Joining them five minutes later were Dianne and Artie from Propulsion Engineering.

“We thought we’d better come over and see our little shrieker off. Oh, and yes,” Dianne said with a resigned nod, “this turbine shrieks at about nine decibels higher than a regular jet engine. We’ll pack some deadening materials in the final ones to cut that back, but they will never be whisper quiet. Just thought you needed to know. Artie?”

He nodded and proceeded to hand out ear protector plugs. He paused in front of Bud and Zimby. “Who’s going up first?” he inquired. “He gets the radio plugs.”

Zimby, a gentleman, pointed at Bud at the same time Bud, trying his best to be a nice guy, pointed at Zimby.

With an exaggerated sigh, Artie pulled out a large coin and showed it to the two pilots. “This is the official P.E. coin flip coin. This side with Tom’s face on it is heads and the side with the back end of a mule is tails.” It had exactly those images embossed in the metal making everyone laugh.

“Okay, who represents the home team?” Bud motioned for Zimby to take the honors, but was surprised when Artie told them, “Fine, visitors call the toss. Call it before I throw it, please.”

“Tails.”

It came up tails and Bud won the honors even though he gladly would have allowed Zimby to take the toss.

“Not to worry, Zim. Coin flip or not, you take her up first. I’ll get my chance later today. Just bring her back in one piece with the wheels on the ground, not pointing up at the sky!”

Zimby headed for the restroom where he changed into his flight suit. He returned with his helmet in his hand but handed it over to Hank when the big engineer and Enterprises pattern maker shook his head, holding out a brand new one.

“Helmets now have new instrumentation in the heads up display, and the chin bar magnetically locks down to the fuselage when you start to roll forward to keep your head from rolling or banging around. Also, this one fits you, Zimby. Barclay’s is over on the bench, and Tom’s is in his office waiting until you two shake the thing down.”

Zimby's first run of the day was simply to taxi the small jet around the grounds of Enterprises. He first headed east toward the hangar cluster before turning south and traversing the entire four miles of the grounds. Next came a turn to the west and a run down the number four runway just to the speed where the nose wanted to lift off.

When he returned to the Barn fifty minutes later and disconnected himself from the jet he had a worried look on his face.

"I don't want to scare anyone else who might climb on, but she is a little prone to want to tip to the side in any turn. As in, keep it under about five miles per hour or expect the drag a wingtip. I came really close twice before I got that figured out."

Tom looked and Hank was nodding. "Yeah," he said wearily. "Both Arv and I figured the extra beefy wings and the mechanisms for the tip rudders was going to make the narrow undercarriage give us problems. Once you get a short flight out of it today, give us the rest of today and all tomorrow and we'll replace the current landing gear with a new set that gives you an extra three feet of outer spacing and a lot more stability."

Tom went over and checked the battery situation. Zimby's taxi tests had consumed about twenty-three percent of the power, so he motioned Bud to drag over the charging cable. With it plugged in, the little jet was back at full power twenty minutes later.

After checking with Tom, who agreed, Zimby took the jet out a second time, except this time as he rolled to the south he let the jet take off.

As he turned back and paralleled the runway heading north everyone could see the jet was responding to his control commands with ease.

"Looks to me those wing tip rudders are going to be a success," Bud said before being told they would not go into action at the slow speed the jet currently traveled.

"That'll be up to you day after tomorrow, Bud," Arv said with a grin. "Then, you can pay Hank the money you will be owing him. I'll be satisfied just to know that our concept is a success."

Zimby's flight was set for just twenty minutes and when he landed he had a difficult time keeping the jet from dropping one wing and spinning in that direction.

"Get that new landing gear on her as soon as possible," he asked. "She takes off nice but getting her to behave once the wheels come back to ground is about as hairy a job as I've ever

had.”

Two days later, and with the new gear installed, Tom, Hank and Arv watched as Bud took off. His first test was a steep climb which the jet handled mostly as Tom expected it would. It would only be later when he saw that the actual climb rate was nearly twenty-five percent less than he wanted.

Bud made slow and fast flight legs all up and down the lake trying to keep no farther from the shore than about four hundred feet.

By the time he landed an hour later his face was pale and his eyes wide.

Placing a hand of Tom’s shoulder to stabilize himself, Bud said in a loud whisper, “You remember my calling this a Tasmanian Air Devil? Well, I’ve changed my mind. It is a Devil, all right but there are hints of being one of the great air... uhh, aircycles of all time. Whew!”

Hank stepped forward and asked for a rundown on anything Bud found to be deficient.

Before saying anything, Bud pulled his wallet out, removed a twenty dollar bill, tore it in half and handed Hank part of it.

“That Devil’s aircycle and your little wing rudders can just about turn on a dime, and that’s nearly what happened over the south part of the lake, I tried to see how tight a turn I could make and found myself almost flying backwards. Luckily she kept going around and I got back control once I’d made a three-sixty.”

Hank and Arv promised to get to the bottom of the spin that should not have been possible with the limiters they had installed.

As they walked to the jet, Tom and Bud headed for the small shed about two hundred feet away that housed the stairs and elevator down to the underground hangar of the *Sky Queen* and Tom’s small office, lab and sleeping quarters.

“How much power did you end up with?” the inventor asked.

Bud shook his head. “You’re not going to like it. That hour chewed up over sixty percent of the power in the batteries.”

Tom laughed. “Not outside what I thought might happen. You do recall there are a total of twelve slots for battery sets, or blades as some call them. You only had three in there. If you had all of the spots filled you would have had nearly five total hours. It isn’t enough, not for the final aircraft, but it does show Dianne, Artie and the others have managed to get power consumption down.”

In all, as Tom described his ideas to the flyer, the actual aircraft would carry about four times the battery capacity as the aircycle. And, those batteries would be lighter by about twenty percent and with higher amperage ratings.

“Then there is the matter of them actively being recharged as we fly in daylight. My guess is that we won’t be getting them below about ninety-eight percent until it turns dark wherever we are flying at that time. As long as we can get six solid hours of high-speed flight and still have a couple hours in reserve, we’ll catch up to the sun and the charge process begins anew.” He looked at his best friend who was sitting across the desk looking as if he were contemplating something. “What?”

Bud took a deep breath through his nose and let it out the same way.

“Okay, the jet handles nicely and the power thing may not be a *thing*, but you haven’t asked me about how fast it would go.”

“Fine, how fast would it go?”

“I topped out at four hundred seventeen knots and couldn’t squeeze another knot out of it.”

“Oh. I see. Well, while I had hoped for at least four-fifty or four-sixty from this single turbine, Dianne tells me they still have a few tricks to up the thrust. We shall see.”

While Bud walked back to the elevator Tom made a call to the Propulsion Engineering people.

“I was afraid of that,” Dianne told him. “Well, actually he got more speed from it than I... that *we* thought. We were hoping for four hundred even. There are a couple things we can do. One is to upsize the turbine by about twenty percent. That is definitely going to make the wings have a bulge front to back. Then we believe we can make a new electric motor that has finer wire windings, so we get more of them in the stator ring.”

When she paused, Tom asked, “Any good making room for a few more magnets to shove things around?”

“Well... we’re close to diminishing returns as it is. You can’t have the magnets too close or they interfere with each other in current motor configurations. Now, if there was some newer electric motor technology out there to either pioneer, lease or buy, we could try new things.”

He thanked her and encouraged her team to keep at it explaining he might have a small idea or two but needed to do a lot of research before he could tell then what was on his mind.



He went back up to ground level and was walking toward the Administration building when Phil Radnor—the number two man in Security—came running out to see him.

“Slow down, Phil and catch your breath,” Tom said to the slightly pudgy man who was about ten years his senior. He was bent over with his hands on his knees.

“I’m... (deep breath) okay, skipper... (another deep breath) just give me a sec...” and ten seconds later he straightened up and seemed to be fine. “There. Not in as bad a shape as we both thought!” He grinned. “The reason I hoofed it over here is because Harlan just got the word that old man Whitcomb out in British Columbia, as in Robert Whitcomb, the senior, has been reported missing!”

Tom stared at Phil. “They’re certain he’s disappeared and not just gone on an unannounced vacation?”

Phil nodded. “Yeah. Really sure. The odd part is yesterday afternoon he sent out a news release telling the world he was re-taking control of the company and that the current manager was being moved out of the picture. Then... *poof!*”



**STORAGE WOES**

IF THERE was anything Tom knew inside and out, it was battery technology. Starting back with the build of the original Outpost in Space and his incredible Solar Battery, all the way through the more recent ultra-thin battery that was basically painted on in layers, he understood what needed to be done to get power to go in, power to remain in until called upon, and then getting maximum power back out.

There was still one small problem to overcome and that had to do with the affects of the icy cold of the upper atmosphere on batteries. It wasn't good.

Certainly it could be overcome with a heater keeping things within the "sweet zone" temperature for a particular technology and battery type, but heaters required one thing he would not have in abundance beyond what was needed by the aircraft... electricity!

"What about piezo crystals?" Bud asked recalling that Tom had originally wanted to use that technology of bending electricity-producing crystals in his hand-held MultiCorder.

"How do we flex the crystals, Bud?" Tom asked looking out of the corner of his eyes at the flyer. "That takes some mechanical action, and short of having you pedal all the way around the world, that's going to consume power."

"Oh." Bud seemed disappointed before he brightened. "How about setting up something that creates just enough buffeting action across, oh, let's say the top of the fuselage and that vibrates a pad over a bed of crystals and they create power?"

Tom thought the suggestion over for a moment.

"You know, Bud... it won't hurt to try an experiment. If I could set maybe fifty crystals under a six-by-five-inch sheet and interconnect them to a power regulator and then into a temporary battery, that might give enough power to run a small heating pad under a battery pack. Of course," he said scrunching up his face as another thought hit him, "we are going to have five main packs, and while the one in the fuselage behind your seat can benefit from our body heat, the four wing packs might need their own source. Well, we'll see."

On his way home that evening the inventor stopped in front of a new house being built a few blocks from his and Bashalli's

home. Workers were up on the brand new roof installing some solar panels. But, as he watched, two of them climbed up a long ladder with something different perched on their shoulders. It was about the size of a solar panel, but at least three times thicker and featured several black tubes exiting at opposite corners.

With a big grin on his face, Tom raced for home. He barely kissed Bashalli and patted Bart on the head before going over to the phone and sitting on the sofa.

“Bud? I just figured out a better way,” he said without any greeting. “Meet me in the underground lab tomorrow sometime after ten... No, I won’t tell you what this is, just trust me. It will work.”

Coming over to him to hand him their rather confused son, Bashalli asked, “What was that about?”

While giving the boy a hug and a kiss on top of his head, he told her of the issues with battery output and temperature and the struggles he was having providing enough power just for the flight systems and instruments without placing an extra burden on them to power battery warmers.

When he described what he’d seen a few blocks away, she paused and then smiled brightly. “I get it!” she told him. “Will it work at night even?”

Now, his face went serious, but he nodded, cautiously. “I think we can store enough heat to get us through what will probably be a six-hour dark period, Bash. I might have to play around with some things, but it might just be the solution I need.”

The next morning he sat down at the breakfast table and had scrambled eggs and home made biscuits with the last of the strawberry jam Bashalli had made the previous summer.

“You’re getting really good at the biscuits, Bash,” he complimented her as he popped the last of his fourth one into his mouth. After he swallowed he got up, kissed her and went over to pick up Bart. “Hey there, slugger,” he said to his son. “Daddy’s off to work to make some pretty neat advancements in electricity. Be good for mommy, okay?”

Bart looked at his father quite seriously and nodded. “I’m good for Momma while Dadda is making ‘lectricity go better. Bye!” and with that the boys attention went back to the model helicopter he had been flying around on the floor.

Bashalli giggled. “I guess you’ve been dismissed. But, come over here and give me a big sloppy kiss before I go get Mary

changed and fed.”

Tom left three minutes later, a goofy grin on his face that didn't come off for almost the entire drive to Enterprises.

When he heard the footsteps of his best friend coming across the hangar floor a couple hours later, Tom looked up from the maze of tubes, a sheet of dark fabric and an apparatus with a raised one-gallon jug of light blue fluid.

Bud stopped in the doorway looking at what Tom had on his small lab bench. He leaned farther inside keeping his hands clutching the outside of the frame.

“Okay, first, what is it and then, is it safe?”

“It is what I hope will solve one of our battery problems and until I amp this up later it is entirely safe.” When Bud's look of caution deepened, Tom laughed. “It'll be safe at any size, flyboy!”

Bud came in and pulled his favorite lab stool up to the end of the bench. He watched Tom connect tubes to the top and bottom of the jug and also to what looked like a very small aquarium pump. Next to that was a simple 9-volt battery sitting on a circuit board with just a couple tiny components, and a small switch. And, next to that was a small solar panel made, quickly that morning, by the Solar Energy department.

It was not made from their special solar plastic—what had been used on numerous small projects where it was important to duplicate the look of feathers, fur or even scales—but from a one-foot square of black fabric.

“Okay. I see that's power fabric your cousin Tommy and her friend Betty developed, right?” Tom nodded. “Good. Then I'm seeing a pump that is connected to both a zig-zag of little tubes and then to the blue juice in the jug. So,” he shrugged, “tell me what it all spells out, please.”

Tom chuckled. “I will endeavor to educate you, my friend. That fabric does definitely create power, but just a little. What it does when I move this special lamp over it,” he did so, “and then activate the switch,” again, he pulled the indicated object over and positioned it, “is create heat; we have a closed loop system that heats the liquid, circulates it through a pump powered by some of the electricity the fabric makes and then goes back up to the top of the jug and it repeats and repeats.”

Bud held up his right index finger. “Correct me if I am once again wrong, but isn't that sort of like a solar water heater works?”

Now, Tom laughed. “That is what gave me the idea.” He told Bud about what he’d seen and thought the evening before. Bud and Sandy’s home had such a system that gave them almost unlimited hot water during the daytime and helped heat their home during winter months.

“Then, forgive me for not being able to add two plus two, but why the battery?”

“Initially, just to get things moving. Once the light gets the fabric making some power to recharge the battery, and the light heats the fabric up which also heats up the liquid, that battery is simply a handy storage spot for excess power. I’m ready to give it a try. Want to press the start switch?”

Nodding, Bud smiled and got up from his stool as Tom made certain both the fabric and light were in a good position.

“Now, Bud.”

The flyer pressed the button and released it, stepping back. A few bubbles rose up the tube from the pump to the bottom of the jug before the whirl of the pump increased and the bubbles and liquid started coming down. They both watched as the bubbles moved through the pump, out the other side, and headed for the covered set of small tubes.

Tom checked a small meter to his right and smiled at seeing the fabric was not just making electricity, it was actively heating the liquid. That was the most special thing about Tommy Swift’s solar fabric. It was black because it used the heat absorbed from light to create electricity. Now, Tom took advantage of the excess heat that normally radiated off the back side to heat the water.

“We started with the liquid at sixty-eight degrees, Bud, and it is exiting the radiator of tubes at eighty-three right now. It ought to go up as we run this thing.”

Over the next half hour the exit temperature rose to over one hundred-three degrees and the temperature of the liquid coming down into the pump was up to eighty-one.

The amount of power in the small battery was sitting at a full one hundred percent of its capability. Unnoticed until now, Bud spotted a small set of LEDs on the circuit board. The first of the six had just begun to glow.

“And the little lights?”

“Those are burning off excess power that we can’t continue to shove into the battery. And that,” he grinned, “means this little setup is proving my theory that it will heat the batteries as well as

give us a little extra electricity for things such as running the heating system at night.”

He told his friend the direction they would travel would mean their “nights” would be fairly brief as they raced to meet the sun rather than forever trying to keep up with it.”

“Let’s head over to talk to dad,” Tom suggested. “I want to tell him about this. I think it will be safe to let this run on its own.”

“Hmmm? Is that liquid flammable?” Bud asked, not certain he agreed to an unchaperoned test.

“Only if broken down into hydrogen and oxygen, flyboy. That is just colored water. Let’s go.”

As they crossed under the nose of the *Sky Queen* Tom explained, “I have a camera pointed on that and can check it on my smart watch any time. See?” He held out his wrist, tapped the watch face and they both saw the test rig running with insets of temperature and electrical power in the upper corners.

Over at the Administration building, Tom stopped just long enough to ask their secretary a question.

“Trent? When was the last time I sent Bashalli flowers?”

The man flipped through a small book sitting to his left and looked up. “Well, unless you are going around me and doing it yourself—” Bud snorted. “—then you last asked me to send her an arrangement when she went into the hospital to give birth to your daughter, so three months ago. And, before that it was nearly two years of ‘you don’t send me flowers any more,’ for the poor woman.”

Tom grinned, a little embarrassed. “Uhhh, could you send some yellow roses to her today? The note should say, ‘I love you and will show you how much tonight. Get one of the Grans on sitter detail.’ Thanks, Trent!”

Bud hesitated as Tom opened the door. Trent looked at him and rolled his eyes. “Okay, an arrangement for Sandra as well. And, she loves tulips but they are not in season. I’ll see if I can get her some purple anemones. She likes those as well.”

Bud reached over the desk and shook Munford’s hand. “You, sir, are a gem!”

As the big door closed, Munford Trent smiled to himself as he muttered softly, “You’ve got that right, Mr. Barclay!”

“What brings my favorite son and son-in-law in to see me this morning,” Damon Swift asked. He rose from behind his large

desk and came to shake their hands.

“I wanted to give you some updates on the solar plane,” Tom explained.

“Then,” his father said pointing at the conference area of the office, “let’s have a seat.”

Tom described a few of the things he had come up against, including running the electrical turbofans at a high enough speed to give them not just flight capability, but to get them accelerated to the point where they might actually get around the world in just a day and a half. Then, he turned to the issue of power and battery temperature.

“Take a look at this,” he suggested pulling the remote control for the telejector that could put an incredible 3D image right over the table. He tapped in a few commands and they were soon looking at the output from the camera in his underground lab.

“And, those numbers?” his father asked.

“On the left is the temperature of the fluid—water in this case but probably glycol-based in the real system. It is now a full thirty degrees higher than when this started...” he looked at his watch, “...fifty-two minutes ago. The other is the amount of electrical power coming out of that square foot of solar cloth and going into the small storage battery. And—” He stopped as he saw the set of small lamps on the board. All were glowing brightly. Too brightly for his liking.

Tom jumped up and raced from the room leaving a startled older man and a younger man sitting there.

“What do you suppose that’s about?” Damon asked.

“I think Tom’s worried about the electrical buildup. Those lamps are supposed to burn off excess power to keep his little battery from exploding. Looks like there is too much power coming through. I hope he gets there in time.”

“Me, too, Bud.”

As they watched over the next four minutes the little circuit board began to put off small wisps of smoke. But, before it could go on too long Tom was seen to race over and slam his hand down on the switch, cutting off the power. He also pulled the solar fabric from over the tubes and, grabbing a rubber safety glove, disconnected the battery.

Turning to face the camera, he grinned and mouthed the words, “Made it!”



He then motioned them to stay there and left the lab. When he marched back into the office he was still holding onto the 9-volt battery that had swelled up and threatened to split open.

After pulling the glove off his hand and getting it inside out to contain the battery, he placed it into his trash bin and came to sit with the other two men.

“Well, it was close, but it certainly proves that the system will work. I’ll have to shunt off all excess power into the main system to keep from a repeat of that little near fiasco, but by golly, I think I’ve tackled the battery temperature issue.”

Damon agreed it looked good and encouraged his son to continue plugging away at the other problems that seemed to be adding themselves to the long list on a daily basis.

“I am still wondering about the main power situation, Tom. You told me a couple weeks ago you wanted an entire body sheath of the solar materials Jim English and his team create, but it might fall short. Have you thought about Tommy and Betty’s fabric as an outer cover for the fuselage?” He raised an eyebrow.

Tom nodded, but admitted it had only been in the last two days. “It’s great stuff, but it really needs to be directly facing the source of light to be as effective as possible, where Jim’s material can accept angular solar rays as low as about five degrees and do great things with them. I’d love to say I could make all forward-facing surfaces out of the cloth and everything else from the more solid material, but then as the sun gets overhead or even a bit behind us, we’d lose the ability to heat the batteries.”

“Unless you made them part of the overall power system,” Damon offered.

Tom looked at his father. “Right,” he said cautiously, “but I’m already having problems making enough power overall.”

Damon suggested Tom think about it some more before he had to leave for a meeting with the Propulsion Engineering department regarding a new rocket motor for one of the new weather satellites the Swifts were about to launch for the nation of Denmark.

Tom and Bud sat in the comfortable chairs another ten minutes talking about what else could be done to provide them power.

“It might be easier to fly with just one pilot, skipper,” Bud said rather sadly. “And, I know this is your baby so I’d step aside if it meant you could succeed.”

Tom shook his head. “Won’t do, Bud. The rules state two pilots for safety and both over one hundred-fifty pounds and at least twenty-one years old. Sorry to tell you, but you are indispensable for this project!”

Nine days came and went as Tom struggled to find a way to make the most power at all times of the daylight they would fly in before a rather elegant—yet not so easy to accomplish—plan came to mind. He walked down the hall from the large lab he used and into the office.

“Dad,” he began, “Can I run something past you?”

“Certainly. Here at my desk or over in the comfy seats?”

“Here will do. It’ll be short, I think.”

“Want a coffee? I’m getting myself one.”

“No, but go ahead.” When Damon came back to the desk Tom started. “This has to do with the power thing for the *Solar Chaser*. That’s Bud’s name for the new jet. I suppose it is descriptive so it’ll stay. I think we both agree that the two materials we have available are unique and individual in their applications. Sure, there is a bit of spill-over, but where Tommy’s fabric is absolutely fantastic for creating heat and power from direct light, Jim’s materials put out more than their fair share of power in other light conditions.”

“A bit of preaching to the choir, son, but go on.”

Tom grinned. “Just getting some things straight in my head. Sorry. So, the fuselage is going to need to be covered all over with Jim’s materials. I can’t see a way to get around that. But, I think I have a plan where I cannot simply and statically use both types of materials on the wings, I can set them up under a very lightweight clear covering and rotate them around the wings to bring the solar fabric to the best possible positions at all times during the day.”

He paused and watched as his father pictured this. A moment later both men were grinning at the realization of what this might mean.

“The only thing left is how to do it,” Tom admitted.

Damon nodded and looked contemplative. “I would have to believe the outer covering stays in place at all times. Correct?” Tom nodded. “Fine. That leaves the solar power materials to become a continuous belt that slowly rotates around. Less than a millimeter a minute. Probably a third that rate.”

“Except during our few hours of darkness when they need to

reset faster. But, go on.”

“So, how wide a band of Tommy’s fabric will you require?”

Tom had already figured that and smiled. “It needs to be a band about four inches tall and not more than seven feet wide to provide power and heat for all the battery warmers.”

Now, his father looked at him with squinted eyes. “What about cabin warmth? If you are stealing power for that from the main system, why not add that need to the solar fabric output. In fact, why not use a large closed loop water heating system for all your heating needs?”

Tom had to stop to consider that. In a moment he was nodding his agreement.

“In that case, the fabric strip needs to be about double what I just said.”

Over the following two weeks Tom designed a new set of wings. They would still incorporate the electric turbines but would now be slightly thicker to accommodate three bands of solar materials. It had to be divided like that because of the overall depth of the wings changing by as much as two feet from the connection point to the fuselage out to the wing tips.

That, however, worked very well as it meant one band was placed between the air intakes and the main body, another just outside the intakes and out fifteen feet, then the third, final, band from that point out another fifteen feet. The outer wingtips—about nine feet—would just be a solid unmoving band of the plasticized materials coming from Enterprises’ own Solar Power group.



## CHAPTER 15 /

### THE IMPORTANCE OF TESTING EARNESTLY

ONE OF THE most curious aspects of any missing person investigation was just where do you begin? Harlan had many such investigations under his belt, but the Robert Whitcomb disappearance felt as if it was going to task him greater than any other.

To start with, Robert, Jr. refused to acknowledge that his father had sent the press release in the first place, and that he was indeed missing. He claimed it was a former disgruntled employee who disappeared shortly after that.

“My father is in a facility at the present time resting, Mr. Ames. I cannot tell you where he is as it was his stated wish that nobody short of the Prime Minister up here, or your own President would be told. Sorry, but that is all I have to say on the matter. Good day!” and he hung up.

Taking the receiver from his ear and looking at it somewhat incredulously, Harlan hung up before pulling out a black notebook and flipping through several pages until he came upon a phone number. He dialed it, waited for it to ring twice, and hung up.

We waited about a minute before his phone rang.

“It’s Harlan, Alex. We have a code D as in David missing person and he is a foreign national. I’ve got an ongoing investigation he fits into and has mysteriously gone invisible.”

He told the man at the other end about the current solar challenge, about Whitcomb Aeronautics and about the helicopter. When he got to the succession from father supposedly to son, the man made a slight coughing sound. Harlan immediately stopped.

“Harlan, there is no such human as Robert Whitcomb, Junior. He has a daughter whom we list only by her first initial, the letter O as in onion, but that’s it. Let me have an hour to call in some folks above the border. I’ll be back to you.”

The phone went *click*, and Harlan hung up.

Tom was dissatisfied with the progress being made, or not being made, on the turbines. In spite of everything Dianne and her team did, the power drain to thrust gain was alarmingly

heading to the wrong side.

One attempt at making the turbine blades from a lighter and very strong polymer looked to be of some help, until the blades—hit by a gust of wind as part of the programmed wind tunnel test—flexed a bit too much and too unevenly, twisted a lot, and shattered rendering the turbine somewhat the worse for wear.

A second test using the same polymer but surrounding a core of magnetanium alloy for added strength and stiffness worked, and appeared to be a winner as they came in seventeen percent lighter and let the test turbine turn nearly three thousand RPM faster.

*At least*, Tom thought as he drove home that day, *one thing has worked out this week*.

On and on it went, day-by-day and small change by change. Some were nominal winners, some were outright winners and a few simply pointed to way to something better.

It neatly hammered home the concept his father had told him as a youngster, test, test and test again. Then, when you feel you have it right, test one last time as if it were imperfect so you don't influence how you perform your tests.

More than one thing had failed that final, mostly unbiased test cycle. Those that passed almost always were fully functional and about as good as the young man might hope for.

Now, the new turbine blades had passed a static test but Tom felt a real-world flight test was in order.

Artie and Dianne and their team hand-forged two sets of blades and created a new turbine housing. This one would be mounted underneath the *Sky Queen* and used only for testing the overall turbine durability, not for thrust or power consumption.

A little nagging thought in the back of Tom's mind told him that to take it up as a primary source of locomotion was asking for troubles, and he'd had it up to his teeth with the various troubles this contest was bringing his way.

Bright and early of that Friday morning the *Queen*, that had been raised to ground level two days before to be fitted with the special test pod for the turbine, taxied forward with Deke Bodack at the controls, Slim Davis next to him and Tom sitting at a station behind them monitoring everything about the turbine, including images from cameras mounted in front of and behind the pod.

"You are clear for either vertical take-off," the control tower

radioed, “or roll out on runway zero-zero. Call your choice.”

“Roger, tower. We’ll take the roll method. Will be in position in one minute. Do you want us to hold?”

“Negative,” came the response. “When ready, the sky is yours. Tell the skipper we’re pulling for this test of his. Out.”

As the triple-decker jet moved down the runway Bud, who was sitting in a jump seat on the lower deck, checked his intercom as well as his two-monitor set-up. On it he could see what the outside cameras did and would be on lookout for troubles.

His intercom link was to Tom who would be making decisions based on what he was seeing on his instruments, but Bud was tasked with making a decision to eject the pod should Tom not be quick enough.

As the inventor had told him the afternoon before, “It isn’t that I expect the turbine to shred itself and do any damage to the *Queen*—that would be a practical impossibility—it’s that if the turbine does get into trouble and we eject it, it will stop as it falls away. Then, there is a small chute in the pod that will lower it to the ground without further damage.”

Their flight would take them to the south of Enterprises almost as far south as Pottersville at the lower end of Lake Carlopa. Nearly all of that area, at least starting about four hundred feet from the actual lake, was deserted so it was even less than unlikely the dropped pod—or any turbine blades that shattered and were ejected from the case—would inconvenience anybody.

The giant jet rose to an altitude of just three thousand feet before Tom flipped switches and started the turbine.

When Harlan received a call back from “Alex” it was to tell him two facts. First, Robert, Sr. had indeed issued a press release through a local news station in Victoria.

“The station manager wasn’t about to discuss it until my associates in the government reminded her their license was up for renewal and there were two other media conglomerates who wanted it. She came across with a photocopy of his original release, supposedly dropped off in her office by the man himself, with a verifiable signature.”

The second thing he let Enterprises’ Security chief know was that Robert returned to his house that same afternoon, the news came out in the six o’clock broadcast and he disappeared within

the hour.

“I do not like this at all, Alex,” Harlan stated.

“Neither do we, my friend. Pressure will be supplied and applied, but it will take several days to get anywhere. I wish I could do more, but you know about these foreign restrictions we live under...”

Harlan did, having been severely injured in the line of duty as a former Secret Service officer, he'd left the organization rather than take a “soft” assignment then notified he would not be allowed to track down the person who'd hired a man to kill the Vice President.

The politician was saved but Harlan took the large caliber shell to his chest and almost to his heart.

“He's a foreign national with diplomatic immunity, Mr. Ames. Sorry, but department regulations...” and the rest was lost to his ears as he stormed from his Director's office to hammer out his resignation letter.

The inventor watched as the turbine reported its speed passing twenty thousand revolutions per minute. In a larger, fuel-powered turbine this would be enough to get an aircraft moving forward in a fast taxi. Up here, attached to the belly of the *Sky Queen* it was making zero difference, but he was starting to get some meaningful test results.

“Bud, keep a good look out at the front. I'll do it as well, but if you spot anything wobbling inside there, shout it out.”

The flyer acknowledged and kept his eyes glued to his monitor.

Tom slid the power bar up and soon the turbine was spinning another ten thousand RPM.

He reported to them all, “The mounting points have vibration sensors and I'm not seeing anything out of line so far. I'm going to let it run at the current speed, about three-fifths what it needs to manage, for five minutes before I up it again. Everyone keep attentive, please.”

When the time came he increased the turbine another ten thousand revs, planning the next two would be in five thousand rev increments.

“Saw a one-second flash of something in there,” Bud reported, “but it went away too quickly. Seems okay now.”



The vibration sensors had also picked up an anomaly and Tom was a little worried about it. He backed the power off and brought the turbine back to thirty-five thousand revs for ten full minutes. Then, deciding it might have been a bad blip of data coming in, he brought it back to forty- and then forty-five thousand.

It ran well and was stable so Tom turned to his readouts for the level of thrust coming out the back end. To get the best reading he asked the pilots to stop and hover where they were.

A disappointed groan came through everyone's headsets as he saw only minimal increase in thrust at the current turbine speed over the more traditional all-metal blades.

"Going for broke," he announced as he added the maximum power to the turbine.

It was better than before, and better than the previous setting would have led him to believe, but it still wasn't the solution to his problems.

And then, it wasn't attached to the bottom of the *Sky Queen*.

Bud's hand slammed down on the **DETACH** button as soon as he saw the first bits of the blades shooting out the back of the turbine. The pod shot down fifty feet before a compressed gas cylinder popped the parachute out. By that time the entire set of blades in the front of the turbine had come apart and everyone looking at a monitor could see the bits sprinkling down like a shower of dust.

Tom put his head in his hands and shook it slightly from side to side. Then, he looked up into the worried face of Slim Davis who'd turned around.

"Let's head back down to try to retrieve that pod," Tom requested, "then home to work to figure out what went wrong and in what order.

The pod was intact even if the insides were mostly missing. Bud and Slim helped Tom search an area a few hundred feet wide and they picked up perhaps a quarter of the shattered blades and brought them back.

The five-minute trip back to Enterprises was made in silence, nobody wanting to say something to Tom that would sound incredibly stupid or heartless such as "It's only another experiment."

They knew how much Tom had mentally invested in the contest.

Bud helped him carry things back to the Propulsion Engineering lab and stayed around for the breakdown and investigation into what had gone wrong.

“Looks like the same flexing thing, Tom,” Artie reported. “It sets up a vibration pattern and then we get twisting and finally full breakdown. Sorry. I really had hopes for this one.”

Tom let out a rueful chuckle, “You and me both, Artie.”

He knew he had the aircraft he wanted. He had the batteries that would give him as much as he could hope for—unless some surprise breakthrough was to be found within the next few weeks, and that was unlikely—but the final leg of the triangle was missing.

What he still did not have were the electric turbines to get him up to the speed he wanted. Five hundred eleven knots from the most recent all-metal turbines was wonderful, but it would land him and Bud back at Enterprises a full forty-eight minutes behind the limit of thirty-six hours.

Things might not have been so bad if he were to ship the plane down to a location in northern Florida where they could simply fly straight out along the 30th parallel and be done with it. But, living up at the 43rd parallel meant a diagonal track down to the proscribed latitude to make the global trek.

A thought occurred to him that the organizers surely would have thought the matter out and would be doing something to handicap those on the line so they didn’t have an advantage over those not flying directly out along the latitude line.

He made a call. Once he was transferred to Rebecca Speers he laid out his problem and thoughts.

“I do see your point, Tom, and what I can tell you is we have a formula to compute exact distance traveled and though it looks like you have all that additional distance to travel, the truth is the angle we’ve given you to fly, both out and coming home, when taken with the curvature of the Earth puts you at the same distance, give or take under four nautical miles, as the entry from the college in Florida.

Tom stopped and cleared his throat. “Ahh, I see. I wish I’d thought about that before I lost sleep thinking we were the ones at the disadvantage. I’m sorry to have bothered you, Ms. Speers.”

“Not a bit of it, Tom. In fact I think this points out a failing on my part to get that information into everyone’s hands. I will be sending out a note in the next half hour that you will also receive. So, I thank you for keeping us honest and forthright about

things. Was there anything else?”

“Actually, one more thing and it has to do with radio frequencies. I find nothing that says we can’t have an absolutely private radio conference with our home base, and yet you call out specific frequencies that, and I quote, ‘must be the only ones used during the actual hours of the flight contest.’ End quote. So...?”

“Ummm, you’re not the only one asking for that to be changed. We’ve talked about it and I can tell you we will make the final decision within the next few days. I guess all I can say is stay tuned. No pun to the radio thing intended, by the way.” She laughed.

Tom did not return the laugh. “None taken,” he said not truly happy with her answer.

He was pleased when, the following day, notification went out to the entrants stating they could use a single private frequency and, if desired, scramble it so that others could not hear their conversations.

He took even greater pleasure in finding out that Octavia Dale had attempted to lodge a complaint over something both trivial and that had absolutely not occurred, and the committee had, figuratively, hit the ceiling telling her she was to cease immediately all attempts to blacken the reputation of any and all other entries, and especially the Swift entry.

Harlan took one final call that week from his contact in Washington D.C., Alex.

“We have a bad situation up there, Harlan, or at least uncomfortable,” the man said. “The Mounties went to the aircraft plant and the manager handed them a letter from Robert Whitcomb. It says to leave him alone, that he has gone into the wilderness to be alone for at least the entire spring and summer, and that he will take legal action against anyone not acceding to his wishes.”

Harlan grunted. It sounded phony to him.

“Anyone verify it came from him?”

“The best handwriting people up there say it is within eleven percent of positively coming from his hand. So, unless you or we get more evidence, they want to drop the investigation. What do you want to do?”

“I sure the heck don’t want to give up until I see Robert

Whitcomb telling either me or Damon Swift to mind our own business.”

Tom had a miserable time trying to get to sleep, and then remain asleep, that night. It was so bad that at three-twenty Bashali got up, kissed him on the forehead, and went downstairs to make them each a cup of warm cocoa.

When she returned and looked at the bed, he was already sitting up.

“Going somewhere?” she asked.

“I was thinking it might let you sleep if I went to the guest room for the rest of the night,”

“Nonsense. Here, drink this and tell me what’s got your mind working overtime.”

He told her everything even things she knew while they both sipped their warm drinks. Every so often she reached out to stroke his forehead or cheek when he seemed to have difficulty getting some part out.

“Do not spare me by trying to make things simplified,” she told him. You go ahead and talk it all out as if I were your father. Well,” she said as she leaned over to kiss his cheek, “perhaps not your father. But, go ahead.”

He told her about the turbine issues and how he might have to re-engineer the wings to hold larger turbines, but that also meant more batteries to store power and how that was nearing the point it would not be possible to cram any more of them inside the plane or wings...

“You certain this isn’t boring you back to sleep?” he asked seeing her eyes were about half closed.

She took a deep breath. “No, I was just trying to picture in my mind what might have happened with your blade things. You say they twisted and broke apart, but aren’t they supposed to be twisted?”

He smiled and leaned his head over to put it on her shoulder. She stroked his hair and told him it would work out.

“It does, you know. You have some setbacks and then something comes up or you discover a new thing or whatever, but I have complete faith in your ability to get this right. And, you will, hear me?”

He lifted his head and smiled at her.

“Yeah, I hear. You’re right and I shouldn’t be losing sleep over this. After all it is just a contest and I’ve won a few these past years, so if I don’t get the speed, I can at least participate and see what others are doing. Who knows, maybe nobody can make it as fast as the prize people want us to fly? At least, not today.

Bashalli smiled as they set their cups on their side tables, pulled the covers up, and she turned out the light.

Her smile grew just before she fell asleep on hearing his rhythmic snoring telling her he had drifted off.

Bashalli made a mental note to only gently wake him for breakfast and to ask if he really had to go in. Maybe he would want to sleep in and refresh his mind and body.

At least, she hoped so.



## CHAPTER 16 /

### SKYWARD SALVATION

TOM AND BUD took off in the *Solar Chaser* just before sun up three weeks later and headed due north toward Canada. They'd been cleared for a narrow corridor up and back between five A.M. and eight, and Tom intended to see if a newer, four-plate photonix collector grid was going to give him noticeably more early light power in a shorter period of time.

After winging out around Lake Carlopa and turning north, they gained some altitude as they passed over the Shopton Regional Airport where the early morning commuter plane was just being readied for its six-thirty outbound flight to Albany.

In a matter of minutes they reached seven thousand feet and were passing Plattsburgh on the western shore of Lake Champlain. A small private jet was just lifting off from their airport, quickly turning to the east.

"Think they're heading for Portland?" Bud asked as he looked out his right-side window.

"Possibly, or they are staying out of Shopton's airspace and will turn south for Albany or one of the large airports down by the city." He paused as they encountered some rough air. "What's your reading for the collectors, Bud? For some reason I can't get my instruments to settle down. It's almost as if someone shook them up and they are having trouble locking onto anything."

"Afraid it's the same back here, skipper. Not really wild, but I'm getting an almost constant tick of the meter needle for the right side. Left seems pretty steady, though."

They flew in silence for another five minutes before Tom let out a sigh or relief and a chuckle. "Well, mine just stabilized for both sides. Yours?"

"Same here. Wonder what was causing it."

"Want to hear my theory?"

Bud was smiling even if Tom couldn't see it. "Any time, Tom. Any time."

"Here goes. Leakage. As in power slopping out of the new concave photonix plates we're testing. You saw your left side readings were stable, and my gauges showed mostly that if a tiny bit jittery, but we both saw the right side was having problems. That's the side the sun is on and I think it is hitting the plates and sort of scooting out and not directly hitting the body of the

plate. Leakage.”

Bud couldn't think of a thing to say that might sound like he understood this, so he satisfied himself with a simple, “Ahhh.” Then, he asked why that was.

“It's a bit like a solar panel, but on a much different reaction scale, Bud. I think our troubles are with having the grid unshielded from side-entering light. As we climbed initially, the rising sun caught the grid and started to produce power, but it slopped out of the grid and that sent our instruments in a tizzy.”

Bud chuckled. “Tizzy? Good word, skipper, but something I'd more expect from my grandmother's generation.”

“Yeah, I know what you mean, but it is descriptive. That power leakage interfered with the proper operation of the plates on that side and registered on our instruments.”

“So, why not anymore?”

“Simple physics, Bud, We are now high enough in the air that the sun is partially shaded by the right wing. The grid is sort of in a shadow so it is producing minimal power and certainly not enough to leak back out. I think I'll need to play around with some sort of blocking shroud for the cockpit.”

He turned them ten degrees to the east and nodded on seeing the instruments were showing signs of the power leakage they'd been discussing.

As they neared the small town of Champlain, Tom radioed the air control for southern Canada and the Montreal area.

“We read you, Swift Two and understand you have prior operational permission. We need to have you remain twenty kilometers from our airport, so please turn to your starboard side to a new heading of... well, zero-three-three will be fine. Thank you. Once you pass over Marieville to our direct east you may resume a zero-zero-zero course for an additional one hundred kilometers. Their navigation beacon is set at one-six-three M-A-V.”

Tom repeated the instructions and the beacon's frequency and identification and thanked the controller. The trip up was uneventful as was a great portion of the southern return trip. It wasn't until they passed over Newport, Vermont they hit a severe air pocket and Tom immediately saw something he did not like. At all!

“Bud? I don't want to alarm you, but I'm showing a great deal of power drop from our batteries. Can you verify?”

“Yes. Pack one is at thirty percent all of a sudden and packs



two through four are just over thirty-six. Want me to radio a mayday?”

Tom thought a moment, not wishing to cause problems all over the area.

“Call Enterprises and tell them what’s happening. Tell them we’re going to head straight into the sun and see if we can pick up some power, but to be ready to pick us up at a small airport. That is, if I can locate one out here.”

As the inventor concentrated on flying the plane Bud got into contact with Shopton.

“Roger, Bud, We’re having the *Sky Queen* brought up and she’ll be on her way in ten minutes. Give us an update about that time and we’ll chart an intercept course for her.”

Tom’s trick of pointing the nose into the sun had some affect, but they were still losing power at the rate of about one percent each four minutes. After asking Bud to take over the flying and suggesting he reduce their speed to only two hundred knots, Tom pulled out his tablet computer and called up a mapping application along with a calculator.

Three minutes later he tapped the screen.

“Bud, I’ll take over now. We’re going to head for Augusta, Maine. We have about two hundred miles to go and at our present power consumption we’ll arrive with about three percent in the batteries. I think we’ll make it.”

There was a pause before Bud said, “I was about to ask why not just head for home. It’s about two-thirds that distance but it hit me we’d be turning away from the sun. Dumb idea, huh?”

“If we didn’t need to keep the nose on the bright yellow ball out there I’d say your idea is better, but...”

Bud made another call to Enterprises and advised them of the new destination.

Slim Davis came on the radio. “Just climbing through ten thousand, Bud. We’ll be there waiting for you unless you two want an escort. You know, just sort of... in case...?”

Tom keyed his mic. “Not going to do us a lot of good. If I’d made the wings so they swung back we might come into the hangar. As it is I’m about to shut down everything we don’t need, like this radio, and even our IFF unit. Can you call ahead, explain the situation, and get us cleared for a direct landing?”

“Will do, skipper. You shut things down now.”

Tom’s fingers flipped off several pieces of equipment and slid

down the curved monitor in front of them. As he was doing that he realized the monitor was a big power user and his decision to outfit the cockpit with it for these test flights, removing the old-fashioned analog instruments even if temporarily, had not been a wise move. He turned his head over his right shoulder. "Bud? Do you still carry that small compass in your flight suit?"

"Sure do, Tom. Why?"

"Because I'm shutting off the instruments monitor up here and back there but need to keep us on course. Try to give me regular updates on a one-one-nine degrees magnetic heading. That'll take us to Augusta."

Five minutes later Tom realized his calculations were not going to be accurate. The batteries were discharging slightly faster now they had a lower level charge. He didn't want to alarm Bud, but it would just be a matter of time before they would be dropping lower and lower.

Two minutes later the *Sky Queen* came along side them and Slim's voice came over the TeleVoc system.

"I see your troubles, skipper. One of your cables from that rotating set of materials on your left side is hanging back about two feet behind the plane. I wish we had air-to-air service capabilities but I guess you'll have to limp in."

Tom silently informed the other pilot of their plight.

"Oh. Nuts!" Slim stated. "Gimme a minute to think."

"You can have four minutes, Slim, That's about the time I'm going to have to slow down to just above stall and look for a handy straight road down there that isn't shrouded in trees."

As Slim contemplated what to do, Tom told Bud about their predicament.

"Yeah, I kinda thought so. I've been trying to see a place to land, but pickings are pretty slim."

Slim's voice pinged Tom again.

"Okay, and you're probably not gonna like this, but you are going to land that plane on top of the *Queen*. No arguments. Zimby tells me he and Bud tried it a year ago in your Toad just for fun. Now, it'll be for real. It's doable, he tells me."

He told the inventor of his intent to drop below the *Solar Chaser* and slow down to two hundred knots. The large jet had a mostly flat top so the only real issue was in setting down with the buffeting winds coming up and over the nose.

When Tom mentioned the fuselage landing strip, Bud

laughed. “Yeah, we did it but it took about fifteen tries to get it right. Then, I only rode the whale for about three minutes. I guess if we can get Red to slow down as we power back then we might stretch the power out a bit. Want me to take this one?”

“Can you truthfully tell me you can see enough to do it?”

“Not really, Tom. Just thought I’d offer. I can try to help talk you thorough what worked for us.”

Tom TeleVoc’d Slim to tell him to go ahead and make the first maneuver. “Once we touch down I’d like to throttle back to about one hundred and fifty knots. That will give us enough power to stay on your back and ride to Augusta.”

The giant jet dropped down below where Tom could see it but he knew it was maneuvering to be right under them and slightly in front.

Once the tip of the nose was visible he and Slim worked in concert to slow them both down until the *Solar Chaser* appeared to be hovering just about ten feet above the top of the *Queen*.

Tom carefully lowered them, deciding to only extend the landing gear once they were within a few feet of touching down.

As the solar plane touched down, a sudden gust of wind blew up and over the nose of his landing spot nearly flipping Tom and Bud upside down and into the giant aircraft’s tail. Luckily, the inventor was a top-notch pilot and had never taken any landing for granted. He noticed things going awry and added power to the drive jet system in time to avoid a catastrophe.

“I forgot to tell you to shove the nose down once we touch,” Bud said, slightly shaken and embarrassed.

It required three tries but the wheels finally hit—evenly—Tom managed to get the stick shoved forward to push the aircraft nose down at the right moment, and he and Slim carefully slowed down by about one-third their speed.

“Can I breath again?” Bud quipped. He knew Tom could handle it and sighed to relieve the tension in their cockpit.

“Breathe deep and steady, Bud, until we have to pop off the top and make our landing. Even with this ride I’m looking at darned little power once we get to Augusta.”

A moment later, the flyer asked, “Could we just have the *Queen* drop out from under us and allow us to glide in?”

It was a thought, but Tom worried that all controls were fly-by-wire and needed some power to operate. He had to find a way to have between 3 to 4 percent power in reserve for flaps, rudder

and brakes.

Well, as he thought about it, possible not brakes and certainly not landing gear. That was already down.

Slim not only did a great job of maintaining an even trim for them, he notified them of any possible wind ahead and even made a call to a small airfield outside the town of Norridgewock in case they had to land earlier. The controller was having coffee in his truck and had to be paged. When he finally came on the radio he apologized after hearing of the possible emergency.

“Jeeze, Swift Two! We barely have a radio room. Don’t even have any weather equipment, just an old sock. We do have two strips, one is a one-five from the north and the other is a zero-three from the south. Name what you want and I’ll get anyone coming close to scoot away!”

“May not need your facility, but wanted to have a back-up. Appreciate it if we do have to set down. Swift Three, temporarily out.”

After Zimby televoc’d them letting Tom know the emergency field was just twenty minutes away and checking to see that the inventor believe he had enough power to continue—or that they needed to set down very soon—he called Norridgewock and let them know they probably would be moving on.

“If things change I’ll call you in the next fifteen minutes. You don’t hear from me it’s because we’re on to Augusta, but give me your name and I’ll have a nice thank you sent out tomorrow!”

After telling Tom they were making a course change, the *Sky Queen* turned them both to the southeast on a more direct course for Augusta.

The tower down there had already been informed of the impending emergency landing and promised to have their one fire truck on the tarmac, ready in case it was needed.

“What sort of fuel load will they be landing with?” the woman at the airport asked.

“Zero fuel. She’s an all-electric and running out of power quickly. I hope we can take your north to south runway as a turn to the other one might be a bit too much to ask.”

“Roger. One-seven is all yours once you get here. I have two commuters coming in over the next seven minutes but your ETA of thirty gives us plenty of time to get them down and back in the air. They only hang around fifteen minutes as it is.”

Tom was fighting his control stick a bit more with each passing minute. It was going to be so close he feared things

might swing the wrong way before they got down.

“I’m wishing I’d waited another couple days for the parachute system to be installed, flyboy.”

“Skipper? Short of controlled flight into terrain, these aircraft coming from the Construction Company can handle just about anything. I’ll pull my harness extra tight before we touch down. It’ll be okay.” He said the last with only a little conviction. He could see the power drain and do the simple math in his head.

With four minutes to go Slim took them down to just three thousand feet.

“I’m going to hop up a little, skipper,” he told Tom, “before I drop away and back out from under you. I’m betting you can glide that plane the rest of the way with your turbines at idle. So, unless you tell me otherwise, stand by for a ten second countdown.”

Tom had nothing to say. He spoke aloud telling Bud what was about to happen and then notified Slim they were ready.

“Fine, then ten... nine... eight...” The countdown ran until it hit “one” and they Tom pulled the stick back and gave his aircraft some forward thrust.

Like a mid-air ballet move, Tom eased the nose up and they lifted about twelve feet at the same time the *Queen* dropped one hundred feet and pulled behind them.

“They’re ready for you on the ground,” Zimby said via TeleVoc before disconnecting so Tom could concentrate.

With almost no power to spare for momentum, the small aircraft was dropping over a heavily-wooded area, passed over a freeway, more trees and finally over the striped threshold of the runway. Barely fifteen feet past the stripes the wheels of the *Solar Chaser* touched down.

As Bud was cheering behind him, Tom allowed the aircraft to race down the runway past the first two turn-offs and all the way to the intersection with their other runway. By this time they were traveling at only about twenty miles per hour so Tom touched the brakes and made the next turn to their small terminal area.

“Jetzt!” Bud exclaimed as they came to a halt. “Reminds me of the runway in Rhode Island. The one that was more patches than anything else. This one looks like someone left it out in the cold and then dropped something on it. Really cracked, huh?”

Tom chuckled. He knew Bud was venting his emotions over their safe landing by using humor. “Absolutely, flyboy.”

As they watched, the larger jet made a nearly silent vertical landing on the grassy field to the north of the runways. There was no room for her to land on tarmac or even be certain if they did the surface would hold that amount of weight.

Tom turned on their radio just in time to watch the light come on and fade into nothingness as the last of their power drained from the batteries.

He manually unlatched their canopy, pushed up on it against the mechanical system, and they both climbed out.

As Bud waited for a woman who was approaching from the nearby building, Tom walked around to the back of the aircraft, spotted the cable Slim had told him about, and saw that the entire panel that was supposed to protect the connection and the extra length of cable was missing.

“Nice landing, Mr. Swift. I’m Cassandra Long, airport manager and part time landing coordinator.”

Bud reached out and shook her hand. “I’m actually Mr. Swift’s faithful sidekick, Bud Barclay,” he told her with a grin. “Tom is checking to see why we had our electricity leak out.”

Not entirely certain what to make of that statement, she smiled and looked around Bud in time to see Tom coming toward them.

After thanking her for allowing them to come in for the emergency landing, and even offering to have Enterprises pay for the call out of their fire equipment, she laughed.

“Gracious, no. They get about one chance a month to run the truck around, put on their big boots and heavy jackets, and get some exercise. It will have done them a world of good, I am glad you made it down. And, I hope I can get a small tour of your electric jet. That fascinates me. We’ve had a couple all-electric prop jobs come through, but not one without a single visible blade.”

Tom obliged her while he had Bud walk out to the waiting *Sky Queen* to arrange for a high-capacity charger to be wheeled over along with some test equipment to ensure there had been no other damage to any of the systems.

“We’re going to be taking part in an around-the-world race next month,” he explained as he opened the front of one of the turbine compartments. As she was looking at the intricate gearing that could turn the turbines at greater than fifty thousand RPM in their high-speed mode, he was taking a look at his solar photonix collector on that side.

It was in good condition, and even now was using some of the sunshine hitting it to start the recharge process. But, without what Bud would bring back it would take two days to fully recharge the battery packs.

He was so engrossed in his inspection that he missed her question.

“Sorry. Miles away,” he explained.

“I was asking where your solar panels are,” she repeated.

“No panels, just a new type of collector system that collects power from the light, even if it is not pointing toward the actual sun. Plus, the entire outer skin will be one big collector.”

She told him she thought it was strange, “but if it works, who am I to judge. Oh, here comes your friend, Mr. Barclay, now.

Bud was driving back in the fire truck. On seeing their primary target get down safely, the driver had detoured to the giant jet that obviously had so much trouble they had to set down in the far grass.

Now, with a greater understanding of what really had gone on, he and his two fellow firefighters agreed to help Bud with the equipment.

The power generator was off-loaded first and connected to the charge port under the fuselage. Next, the test box was brought out and plugged in under the control panel in the cockpit.

Five hours later, and after Tom invited Miss Long and the firefighters to have lunch in the *Sky Queen*, the giant aircraft took off just before Tom and Bud sealed up the *Solar Chaser*, moved her out to the runway and took off, heading for home.

Once aloft Bud had a question.

“If it was just a simple connector coming loose, how could we lose all our power so quickly?”

“Well, we didn’t,” Tom said causing his friend to nearly choke on a gasp. “What happened is simple physics. I need to have all systems interconnected so the small computer can load and charge and draw-balance to all batteries. Each wing has one master cable running along the back of the main wing. Disconnect that and power stops running except for the closest packs to each turbine.”

“So, we had plenty but couldn’t use it?”

“Yes. And I may have to do something about that!”





## CHAPTER 17 /

### RECONFIGURATION

ONCE AIRBORNE, Tom checked out his rate of power consumption, satisfied himself it had only been the disconnected cable—but still not understanding how the panel had come off—and brought the aircraft up to over three hundred knots.

Two hours later he reduced their speed and came down from their current thirty thousand feet altitude and to a pinpoint landing at Enterprises.

“Well, that lasted a lot longer than I wanted it to,” he told Bud and they walked from the Barn where technicians were already starting to go over the entire plane, “but now I have an idea of how much power we have in the batteries. And that, unfortunately, is still not nearly enough. I may even need to re-evaluate the direction we take for the trip.”

Bud stopped walking and stared at Tom. “Huh?”

“Well, I’d planned to head east into the early morning sun and keep a full charge going until the plane gets an hour or so with the sun overhead. Then, the rest of collector components, including a covering for the flaps by the way, will continue to give us power through the first twelve hours of sun or so. My hope was to be in a position by the time the morning sun comes up in front of us as the planet revolves and we get over eastern Africa or even Asia that we’d have the sun coming up again and get another twelve or thirteen hours of charging time. Since we are supposed to make the trip in thirty-six hours or less, we’d do that just the one full night cycle before coming back over the U.S. and heading for home.”

“What’s changed?”

“For starters, we may need to have more hours of charging and that means heading to the west to keep up with the sun as much as possible. But, it also means that the night period would be longer and that might be a killer.

“Come by tomorrow morning and I’ll plot out our anticipated course and we can see if there are ways to get more power.”

Tom was perusing some older notes when a memory surfaced. It was something from his recent encounters with the Electricity Vampires and their mostly invisible airship. During that time,

now only five months ago, in an effort to come up something to help understand how they could manage to shoot down an energy lance that sucked up electrical power, he had touched on a new battery technology that was both willing to send out whatever power it held, down to the last milliamp, but it was power hungry at the same time, charging in minutes rather than over a period of hours.

He searched through his files and notes until he found the five pages he made back then.

It had required three days while he'd tried to come up with something and only stumbled on the battery—also a large component of the bad guys' system—to theoretically hold what they had been stealing.

As he reviewed the notes and looked over the test figures, a smile came to his lips.

The battery he had only built in theory was going to need to be brought to life for real testing, but the computer simulation tests made it look like a potential winner.

Bud found his friend in the large lab in the Administration building late that afternoon. After letting himself in, and on seeing Tom concentrating so hard he hadn't noticed the flyer's arrival, he picked up and brought over his favorite lab stool, climbed on it, and rested his elbows on the drafting table.

Despite appearances, Tom *had* noticed Bud's presence but was trying to decipher one of his notes that had become smudged.

"Hey, Bud," he finally said a minute later. "Just give me a minute of your time to try to read what some ham-fisted young inventor and scientist wrote here using a muddy rock or something." He shoved the page over, tapped one area near the bottom, and let Bud take a brief look at it.

"Which part can't you make out? The part about needing a more powerful rectifier circuit to keep power flowing in the right directions?"

Tom shook his head. "No, I got that one. It's this one over to the lower right."

"Hmmm. You mean the titanium, lithium, gallium note?"

Tom's shoulders sagged. Of course, *that was it!*

"How the world can you read that?" he demanded.

Bud looked at his best friend and smiled. "It may come as a

shock to you but after reading notes from you for about a decade I've become quite adept at figuring out what you've scribbled. So, tell uncle Bud what this is about, and also Sandy tells me you have some new pictures of the littlest angel in all of New York to show me."

Tom slid his cellphone over and Bud called up his photo storage application. There were seven new pictures of Mary by herself, three with her in Bashalli's arms, one in Tom's and five more with little Bart holding her and looking like the most proud big brother ever.

Bud sighed. "Did you ever hold Sandy when she was a baby?"

Tom snorted at the memory. "Yes, up to about the time I was three and she was two. She doubled up her fist and gave me a bloody nose. That was about the last time for that!"

The flyer only nodded. He could envision his darling wife doing just that. "Okay," he said shifting mental gears, "now what about that group of metals? A formula?"

Tom explained the power situation in the *Solar Chaser*. "We just barely can hold enough power to keep aloft for six hours without a constant source of new power, and that is using the best of my laminar battery technology. We need more or we don't make it through the night. It hit me earlier today that something that came up during the Electricity Vampire episode might give us what we need. Or, it is a start or even a dead end. I don't know, yet."

He described how the possible battery technology should be able to recharge so quickly that it might only take ten minutes of sun exposure to give a full charge. Then, it would not only remain fully charged during daylight, it would have so much extra power they might be able to run the turbines at a higher speed during the aircraft's daylight hours.

"Unlike most batteries, this one may give us everything it has. Nearly all batteries hit a point and pretend they are dead, but did you realize that even a flashlight battery that 'runs out,' and he made finger quotes, "actually has between fifteen to twenty percent of its power still in there. It can be coaxed out, but it isn't easy. I'm hoping to overcome that with this new battery formula for the electrode layers."

"So, and correct me if I am off course, but if it works we fly like bats out of hell in the light, making great speed and have extra power to fill the batteries and will therefore mean we won't be making up for slower night flying when it would have been

advisable to fly slower so to not use all the battery power. Is that it?”

Tom smiled and clapped Bud on the shoulder. “Mostly. However, I think this new battery might hold enough power to fly fast even as it is discharging at night. And, only after testing will I know if it might hold a charge longer, giving us its all, as well as nearly instantaneously recharging once we get some sun.”

The flyer agreed to meet Tom back in the lab the next morning when they could try building a real battery using the rediscovered formula.

“It’s going to take a lot of iterations, flyboy, until we get the optimum mixture, but I think we’ll get to something that can be tested before the end of the day tomorrow.”

Bud left to go pickup Sandy Swift-Barclay at the Communications department leaving Tom to start researching any current battery technologies using at least two and possibly all three of the metals.

He found nothing on line referencing the use of the triad of metals, but did locate one that seemed quite dangerous in that it used lithium, gallium and mercury. As soon as he saw a photograph of how much of the small lab had been destroyed when the test rig had exploded he crossed that off his list.

The next morning he and Bud set about in earnest to come up with the best formulation of the three materials for use as a battery. After only five tries, taking them up to about two in the afternoon and just as Chow Winkler came barging in with a late lunch for them, Tom declared they were nearly at their target.

“Target fer what?” Chow asked as he wheeled his lunch cart into the room and through a door on the left side and into the small apartment where Tom—and more rarely his father—spent the night when work kept them at Enterprises until they were so exhausted it would be unsafe for them to drive home.

“Tom’s going out to shoot some armadillos and roadrunners for target practice, Chow,” Bud told the older westerner with a straight face.

“Good. I kin use some o’ each fer a few lunches fer you two, ‘specially Buddy boy here with his smart mouth!” He glared at Bud who smiled back, but blushed a little.

“Actually, Chow,” the inventor came to his friend’s rescue, “in this case the ‘target’ is a specific power profile I’m trying to get out of a new battery. You already know we are entering an around the world air race, right? After all you came in to save me

when one of my battery experiments sort of went *kaboom!*” Chow nodded and stopped setting down dishes on the small table in the apartment.

“Shore. You and Buddy boy are gonna git up and fly all around this here globe o’ ours usin’ ee-lectricity... an’ you best tell Buddy here ta not even try ta mention some great long ee-lectrical cable you’ll be trailin’ along behind ya!” He went back to finished setting up their lunch.

When the two young men sat down and the cook uncovered their plates, both experienced watering mouths as the aromas of turkey piccata over freshly made noodles hit their nostrils.

“Take a seat, Chow,” Tom invited, “And I’ll bring you up to speed.”

The cook sat down on the nearby bed and leaned forward. “Is there gonna be some way fer me ta tag along on this here flight?”

“Well, the plane is only a two-seater, Chow, but if you can get Bud to step down...”

“Naw. I was joshing. I cain’t fly a plane ta save my soul an’ would be as useless as... well, purty useless. Except, I kin make you some vittles ta take along.”

“I’m afraid we may need to eat them cold, oldtimer,” Tom said and explained the power situation.

“Ahh, that ain’t a problem. I got me a new battery-powered mini microwave you can take and I’ll pack the food in special warmin’ trays that’ll heat a full meal up in two minutes. The thing’s as small as a shoebox and don’t even make no fumes or nothin’ so it can be used in confined spaces. Just needs a twelve-volt battery.”

After he told Tom about how little power it required the inventor smiled. “You know I actually have one small space I can put a special battery in to run that, Chow. Thanks!”

The deal was sealed when the chef described how the entire two days of meals would fit into a space about four-inches wide, eight deep and two feet tall. That also would fit nicely into some small free space there would be behind Bud’s back seat.

Ten minutes later he wheeled out the plates after promising to bring by a few test dishes the following day so the boys could try them out.

Tom and Bud went back to the battery project quickly compounding a sticky slurry from the three main metals along with about twenty percent of the graphene mini-threads that go

into the amazing solar cloth from Tommy and Betty over in England. When Bud asked about that addition, Tom smiled.

“There are so many uses for graphene particles and threads we haven’t explored, and I do need something to have as a filler to keep the metals from bonding to each just themselves, so what the heck. Can’t hurt.”

After running a few tests on their home-concocted metal slurry it was agreed to call it a day for their work and to let the people in the Metals department compound the proper amount of the three metals into an alloy. They would be able to deliver a thin sheet of the finished good that could be worked into several test cells.

“They’ll get it to us tomorrow afternoon. By then,” Tom stated, “I hope to have the outer case and the graphene sheets ready. Then, we roll things up and see what we get!”

But, when it did come and Tom and Bud tested it, both were disappointed to see that while it could take a fast charge, it also sent that charge out about as fast meaning that this line of experimentation was probably just a dead end.

After his friend left, Tom sat in the lab going over everything they had tried and hoped to have an “ah-ha!” moment, but it didn’t come. So, at five he closed up the lab, locked the doors and headed home to his family.

“Bud, I’ve been a dunderhead,” Tom stated as he ran into the flyer’s office the next morning.

“About what?”

“About the whole turbine and Tommy’s generator. All this time I’ve thought of it as something to be stuck on the end of the turbine shaft, thereby taking some of our airflow power. What I should have been thinking was a free-standing turbine at the back, maybe even smaller than the actual turbine tube, that free-wheels around and around in the exhaust! It doesn’t even have to be as wide because I can add a thin interim ring with the coils inside and make it minimally invasive to the air flow!”

“Wait. Inside the turbo case?”

Tom nodded and smiled. “Right. Kind of like we have that multi-peller at the back of the Quieturbine engines for extra thrust, only in this case it will be smaller than the diameter so it can stay inside the case rather than be outside the back end.”

“How did this brainstorm come about?”

Tom blushed. “It was Bart. He asked me what the matter was after dinner when he wanted to talk and I just sort of sat there brooding. When I told him about not being able to squeeze the sun enough and how I had hoped to be able to test his cousin Tommy’s special jet turbine, he tapped me on the chin and asked, all serious, why wasn’t I going to use her electricity maker.”

“Yes,” Bud said, “you and I’ve discussed that one several times.”

“Right, but not as seen through the eyes of a young child genius. I was describing how it would put a drag on the turbine—only in slightly simplified terms—when he stopped me and asked why it had to be attached. Why not just put it back behind where the air comes out and let it turn and turn all it wants but not slow down the front part?”

After he checked his watch he picked up the phone and dialed Tommy and Betty’s office.

He explained what his new thoughts were and asked their opinion.

“Well, Betty and I were worried about how fast the turbine might run in generator mode so we built a small one and let some Royal Air Force chaps give it a good wind tunnel test. The thing is it gets to a certain speed and then stops increasing the amount of power, but the darned thing keeps sending out its maximum and stays nice and cool in the fast-running air.”

They were listening on their speaker phone and both ladies heard the whoosh of relief as Tom exhaled.

“You can’t imagine how good that is to hear. I want to take the turbine my propulsion folks are building using your design and frictionless hub and then hang the generator version, probably seventy percent the size, on the back. It won’t be attached to the drive shaft and will likely be ringed with its own set of magnets. I’d like to know your thoughts on keeping the powerful neodymium magnets for the turbine but swapping to cobalt magnets for the generator.”

He and Bud could hear the ladies conversation quietly as they discussed what this could mean. When Tommy came back on, she sounded excited.

“Betts and I believe that might be an even better setup for generators than what we’re using. So, if you don’t mind sharing that with us we don’t mind sharing the other stuff with you. We all win!”

After hanging up, Bud asked for a little more information.

“Okay, we have the front of the turbine that has a ring of electrical coil in the cowling that is held about two millimeters from the tips of the blades. Those actually end in magnets and by running power through the coils we get the thing turning. And, since the shaft sits in a magnetic hub at the front and rear—both completely negatively charged—and that part of the shaft will be a complete ring of positively charged metal, nothing actually touches, so no heat buildup and lots of additional speed is possible.”

“Oh, so it will turn as fast as you give it power?”

“Right. And the generator version at the back takes advantage of the outgoing thrust from the turbine blades inside and as it spins it generates a bunch of free electricity. The very best part? It does it even in the dark of night!”

When Tom spent the next day with the Propulsion Engineering team, and they made a number of changes to meet his new ideas, all were excited to find the turbine that previously topped out at about 40,000 rpm now exceeded 50,000, had about a tenth the heat build-up, and also took only a few additional amps of power to operate.

The best news of all came the following week when they reported the free-wheeling generator set could manage to make enough power even during the night that the battery drain would be about halved.

“Bud, by golly, we’re going to make it around the world! And, to top things off we can go back to my original idea to fly to the east and pick up on the sun that much sooner.”

Work began on a pair of the hybrid power plants/power generators that same day.

It might be cutting things a little close and allow less testing than anyone might hope for, but a computer simulation Tom spent three days devising showed that his theory of cutting the nighttime power drain down was essentially correct.

But, it showed one very important other fact.

During the day when the solar cells were working at peak capacity, the generators would be making too much power to be safely stored.

This was going to necessitate some changes, but he now feared he was straying into the forbidden “exotic technology”



area. So, he made a phone call to the X-Prize people.

“That’s a very interesting question,” Rebecca Speers told him. “Though we haven’t specifically called out such generators they do not truly fit in with the spirit of running on solar. Hmmm? What to tell you, Tom?”

“If it helps, they are simply a reverse version of the turbines we are using for propulsion. Like running an electric motor backward to make electricity. Or, the traditional generators inside jet turbine engines.”

“Oh,” she responded, sounding very surprised. When she asked if it were exactly running their turbine backward he admitted it would be with different types of magnets.

“I see, well, pending a committee meeting tomorrow, and if you don’t hear from me directly you will know you are in the clear, I say you are still going to be within both the rules and the spirit. I look forward to seeing the specifications of this generator some day. And privately, I have to tell you I am impressed by both your team and also the Florida team you are sponsoring. You are both at the top of our betting list, but you never heard that from me!”



## CHAPTER 18 /

### ALL PREPPED AND READY GO TO

WITH THE battery and power generation issues mostly behind them—although Tom had hoped they would come in about twenty-percent lighter—it was time to finalize the solar intake system.

As had always been the plan, Jim English and the four ladies of the Solar Materials group were completing the work on a special thin skin to cover most of the plane. In fact, for the fuselage, other than the nose—a photonix receiver plate behind a curved clear plastic shell—the small bay behind Bud's position that featured a dome for the solar charging battery to run their microwave, and the rudder and elevator surfaces, the rest was to be totally covered. Only the band of Tommy's solar fabric on the forward tops of the wings and the flaps would be different.

For many solar-powered devices their work had been to turn out either stiff or flexible components that would be individually wired to the power system. For this application they were making a special shell that would be pulled and stretched over the surface, then heat-shrunk for a tight and immovable surface. This way only a single connection was necessary—although there would be five failsafe extra connections.

It had been decided, given the power available from Tommy's and Betty's turbines, to not install the moveable band of solar fabric along with a wider band of solar material like the aircraft skin. Instead, and this simplified the wings quite a bit, the front flaps and first four inches of the top of the wing surface would be covered with Tommy's graphene fabric to produce the necessary heat to bring all batteries up to a good temperature early in the morning, let the rest of the solar system based on Enterprises' materials take up that slack later on when the fabric's effectiveness diminished, then use the black fabric again on the trailing flaps and ailerons as the sun went behind them.

As for the batteries inside the body and wings, Tom had reached a good balance point between overall capacity and weight. He might be able to cram in about ten percent more batteries, but the additional weight would burn up that power whenever they climbed.

And, he had the notion they were going to need to climb more than just a few times to avoid commercial air traffic, especially in three main bands running up through Africa to Europe, a

diagonal one from southeast Asia and Australia to Europe, and another one up the eastern coast of Asia.

Then, he realized this would also be the case for the West Coast of the United States and even one or more high-traffic zones as they crossed the country.

The *Solar Chaser* was ninety-five percent finished when Tom just knew he needed one final test of the electrical system, and it would need to be an overnight one.

The only work to be completed was the outer skin, and that would take two full days.

The around the world race was now just ten days in the future, and Tom hoped like the very dickens he would not have to do much more to the aircraft once it was sky worthy.

Luck was on his side when Jim called on Wednesday to announce they were ready with the skin. It was more than three-quarters of a day early, but that was what things were like at Enterprises. When the employees knew something special was on the line, they worked extra hard.

“Wonderful, Jim. Can I taxi her over to your place and leave her in your capable hands?”

“Better than that, Tom. Bud just parked her in front and Darla, Patty, Lindsey and Dianna are crawling all over her doing the last-minute spot cleaning needed to keep this skin adhered. We’ll start the great skinning in about three hours once they roll it into the clean room.”

The clean room was a special-built structure inside the older hangar occupied by Jim’s group. It was just long and wide enough to fit the *Solar Chaser*, so everyone putting the skin on would need to stoop and scuttle under the wings to get around, but they were all young and flexible and understood what needed to be done.

Tom said, “Well, that’s just like Bud to read my mind and do what I was going to have a little fun doing.” He made an exaggerated sigh. “I guess I might mosey on over and see if there’s anything I can do to help... that is, unless you tell me I’ll be useless and in the way.” He sighed again, causing Jim to laugh.

“Naw, come on over whenever you get the restless urge to stand around and watch. That’s the extent of my usefulness these days and for things like this. The ladies know exactly what they are doing and I have the notion they communicate via telepathy because they sure don’t say a lot when they are in action.”

Tom said he'd hold off coming over until the next morning.

When he arrived he was astonished at the progress and at the overall look of the plane. While the nose seemed to be tightly attached, the rest of the skin looked like someone had tried to peel the plane like a banana—from the back—and had made a real mess of the wings.

Jim walked over to where Tom was standing, watching from behind a window into the booth.

“Looks bad right now but it is actually exactly what we expected.”

Tom made a sort of snorting chuckle. “I hope so, Jim.”

“Yeah, the wings are going to come along in the next half hour as they get back to the trailing edges. Those are in two pieces with the bottoms already adhered—they did those first thing this morning. The tops curve over front and back and have all the mandatory cutouts. They get smoothed under and have about a half-inch overlap with the bottoms. Those get sealed before the team moves to the back of the plane.”

Even in the twenty minutes Tom stood there the four ladies made incredible progress. He followed Jim to his office, accepted a cup of coffee and the two talked about the schedule.

“Well, for starters you made the plane exactly to the size the plans say and that's a huge help, Tom. Not that it's happened here, but I can't even count the times we had clients tell us it would be exactly ten by twelve, and we plan for ten by twelve only to find out it is more a wobbly eleven-and seven-eighths by twelve and between three and five thirty-seconds.”

“Jake and his team are as precise as they come in any industry.”

“And, that is going to buy you about six hours of time. Instead of having this finished tomorrow afternoon, we'll get it all stretched and set today and heat shrink it tomorrow morning. By nine you can drive her away.”

Tom went back to his small underground office to run one more check of his power handling software. By four he was finished and had found no problems with anything. So, he set it for an automatic download at midnight and headed over to tell Jim to make certain the plane was plugged into the data network before they closed up for the day.

What he saw amazed him. The jet aircraft was sitting on the tarmac in front of their hangar offices and workspace. It looked

complete.

Dianna came out and gave him a hug.

“Listen, I know it isn’t the best employee and boss behavior thing, but heck, I’m from Oregon and I hug. I’m just so happy you came to see our work before she goes back inside to get the heat treatment.”

“Well,” Tom admitted, “while the hug is non-standard it is appreciated. As is the really incredible work your folks have done. She looks complete, but you say she isn’t as tight as she will be once the heat is turned on?”

“Not yet. We’re letting the sealant glue dry out here before we go over the entire thing with the special heat appliances... well, I say special, but they’re actually salon-certified hair blow driers.” She grinned. Then, her face turned serious.

“Oh, and Jim wanted me to tell you we spotted a small problem, but think we solved it. At the back of the left wing is a small hatch, and I hear the one on the other side opened up when Zimby Cox was doing a flight test on the first version. Anyway,” she continued, seeing Tom’s concerned look, “the hatch sort of popped open as we were moving the ailerons up and down.”

“I see. What did you do about it?” he asked as casually as he could all the time worrying about what it could mean if it opened in flight and they had another near catastrophic cable disconnect. What if it happened as they were over the tallest peaks of the Himalayas? Or, trying to cross one of the oceans?

“After Jim came back in last night and took a look he suggested going ahead and sealing over it. It was supposed to be completely covered anyway. If you want us to we can cut that place open so you can see what is going on.”

Tom thought about it a few seconds before asking her if she saw anything amiss inside.

“No. And we made sure to check the connector in there and give it a good shove, it didn’t budge so we believe it is totally seated.”

Tom made the decision to let it stay sealed. He trusted his people to do the right thing and if Dianna had said she thought it should be checked, he would have done that.

The next morning he asked Bud to retrieve the *Solar Chaser* once she was finished and released and to bring it to the Barn.

“We’ll let her sit out in the sun soaking up power until about four and then you and I will be going up for a night of soaring

around in great big circles.”

Bud smiled. “And, Sandy tells me I get to take her to the best breakfast in town once we land as punishmen—I mean as a *reward* for her indulgence in my not being in our bed tonight.”

By the time Tom and Bud got back to the *Solar Chaser* later that afternoon, the batteries were fully charged and a check of all systems showed them things probably could not have been better.

They lifted off at 5:37 and headed for a long racetrack course the FAA had cleared between 5:00 P.M. and 7:00 the following morning. It went north from Enterprises fifty miles before widening from a twenty mile wide zone out to a bulbous ninety miles. The top eleven miles were technically Canadian airspace but they agreed to open it overnight to the Swifts.

South of Enterprises and the corridor made a forty-five degree turn to the southwest and remained a twenty-mile-wide zone all the way to the Pennsylvania border.

There would be three emergency airfields available to them at various positions, but Tom had no intention of using any of them.

He and Bud agreed that if there was any issue they would immediately head back to Enterprises.

As the electrical turbine vehicle climbed they received more direct sun and the little bit of power loss was quickly topped off. They made one complete circuit of the course over the period of three hours staying at about five hundred knots.

The sun dropped out of sight at eight-fifty-nine and they were now running totally on their batteries.

Chow had not been notified of their overnight test until about one hour before they left so all he managed to pack for them were four sandwiches each and some cold drinks wrapped in foam sleeves to keep them cool.

The flyers had a meal at around ten and then settled in to a three-hour rotation with Bud taking the first period.

When Tom was awakened by his friend singing, “*Good Morning, Good Morning*,” from a Broadway play, he stretched first, had a sip of his cola and checked the gauges.

A smile crossed his face as he plainly could see the battery situation was very good.

The turbine generators from Tommy and Betty were cranking out a great deal of power so their batteries were only down seventeen percent during the five-hour period when they were the only thing making and not consuming power.

“I’ve got it now, Bud,” he called back. “Before you close your eyes, how has she been handling?”

“Pretty great all things considered,” Bud said. “I didn’t want to bother you but we got buzzed by some Canadian Air Force jets as we looped up over Elgin and Havelock. They came along side, both sides actually, and we had a quick exchange over the radio. Seems their wonderful and ever-so-efficient air traffic control system forgot to tell them we were coming. They say they will leave us alone for the time being but would prefer we keep on the U.S. side of the line.”

“Isn’t it always something?” Tom asked as he switched the controls from back to front.

During Bud’s sleep time he pushed the throttle all the way to top setting and watched as the turbines got them up to five hundred-forty-six knots in level flight at thirty-nine thousand feet.

It did drain a little more power than their previous five-twenty, but he knew a shallow dive and slight retard on the throttles would get them back what he’d used.

All in all, when he woke Bud an hour later Tom was wide awake and suggested he could take the rest of their flight which was due to only last another two hours.

“Okay, but first sign your eyes are getting heavy you shout out and I’ll take her,” Bud said.

They landed on time and with nearly thirty percent battery power left. That would be greater when they were flying into the rising sun as that night would be several hours shorter.

The control tower operator greeted them and asked if they might swing to the west to allow the incoming morning flight from Philadelphia to land at Shopton Regional.

“Sure, Tower. We have plenty of juice and it is building as we talk. How about we head wide and down to Pottersville and then come up the lake?”

“That’ll do it. Call when you are turning to come back.”

Twenty minutes later than anticipated, Tom set the wheels down on the runway with barely a jiggle.



As they taxied back to the Barn Bud asked, “So, what’s left to do before the big dance?”

“She gets the bugs wiped off her teeth, I think I need to replace one of the battery packs behind your seat. I brought my tablet computer and had it plugged in to check each pack as it was consistently showing nine percent lower than all the others. I’d hate for it to give out on us and cause us grief. Oh, and then you and I are taking the ladies out for a wonderful evening of dinner, dancing, and pleasant conversation that doesn’t have anything to do with the race or work or anything else they are not acutely interested in.”

Bud laughed as Tom shut everything off.

“Do I get a list of taboo subjects to study or am I supposed to take my hints from our wonderful wives?”

“The ball, as they say, is strictly in their court, flyboy. We listen, smile, nod, tell them they are beautiful and answer what they want to know about.”

Dinner and the entire evening were big hits but were anything other than devoid of talk about the upcoming solar race. In truth, that was nearly all the foursome spoke about, but it was at the request of both Bashalli and Sandy that they understand everything they could.

All four went home please with the results of the evening.

With a one day delay to allow two of the entries to finish and indicate readiness, the Great X-Prize Solar Around-The-World Challenge was officially called to start. Each entry would report once they left the ground as soon after the start time of 6:00 A.M. GMT. While this might have meant a handicap for those taking off from much farther east than about central China, whose planes would be have taken off in darkness, everyone was free to take off as close to their own sun-up as they liked.

For Tom and Bud, and the Florida and Washington D.C. entries, it would mean early morning sun to be flying directly into. The several planes from about Chicago out to Los Angeles—and the Whitcomb entry from British Columbia, would be taking off a couple hours later unless they felt they had the ability to fly the initial hours unaided by solar rays.

What would count was total time in the air which was why the winner would not and could not be announced as soon as the first aircraft landed. It would take nearly a full day to collect and verify all the data. And, that was why each entry carried the

tracker/recorder provided by the X-Prize committee.

Not only would it make frequent reports of flight status but at the end each entry would plug it into a handy USB port on a computer and it would download everything that had happened.

The sun was now half way up over the hills to the east of Lake Carlopa as Tom and Bud turned the plane's nose east into their power source.

"Are you buckled in?" he asked his backseat companion.

"Yep!"

He called the control tower. "Swift Solar ready to roll. I need to you do two things, please. Check with Eastern control and see if we have unabated clearance to head on our first one-five-five leg and also contact the X-Prize offices and give them our time off the deck."

"Roger. Your dad had us pre-contact both parties. You will have clearance for take-off in two minutes with a climb at your leisure to an initial altitude of one-zero thousand feet. We also have the Prize folks on a land line and they are standing by to log you aloft. Coming up on one minute, thirty seconds. Good luck to you and Barclay, skipper. We'll all be watching for the next day and a half."

Over his shoulder, Tom asked, "You ready for this, flyboy?"

Bud chuckled. "Born ready, raised ready, and now regretting I didn't take advantage of the little boy's room half an hour ago. Let's get us some altitude!"

The solar photonix intake shutters—Tom's fix for the leakage issues—were opened fully, they began to roll down the runway picking up speed, and *Solar Chaser* began to rise into the air. Five minutes later the storage banks had begun to fill back up to cover for the power used to get into the air and that extra power now could be used to get up their speed.

"Well, she won't win any awards for instilling whiplash," Bud quipped, "but, I can feel some acceleration. How's it doing up there?"

Tom scanned the instruments. "We've topped two-eighty and have really good lift now. Part of that is the early morning heat from hills this side of the lake, and part of it is our increasing speed. I'd really love to head up about another ten thousand in a hurry, but we have to meter out the power we have until we get above all the clouds."

They raced forward picking up speed all the time as they slowly rose through five thousand and then eleven minutes later received clearance to proceed up through ten thousand feet heading for eighteen thousand. Tom set the nose trim to tilt down about one degree giving him a better view and not affecting their speed or climb rate.

A scan of his instruments showed the solar power was not only keeping up with consumption it was even giving back about four percent power to the storage batteries.

“Let’s make the first call, Bud,” Tom suggested knowing the X-Prize committee required they report at ten thousand feet after take-off.

On hearing that the verification the Swift entry was off the ground, their radioman reported that Tom and Bud were the second entry to “lift” and were only nine minutes behind the other entry.

“Can we be told their identity?” Bud inquired.

“Yes. It is the entry from British Columbia, Whitcomb Aeronautics. They opted to fly out in darkness.”

The name sent a shiver down both young men’s spines.

Bud gulped. “Uhhh, thanks. Swift, out!” He reached over and tapped Tom on the right shoulder. “You heard, so what’s your notion?”

In spite of the fact Bud would not see it, Tom shrugged. “We don’t know which direction they are taking, Bud, and therefore have no idea if there will ever be an encounter with them. Flight direction was never a mandatory report from any of us. We made no secret of it and I think that may have decided things for at least one or two others. They certainly have not made any indication they can fly at supersonic speeds to catch up with us if they head this way, so I guess we ignore them.”



## CHAPTER 19 /

### SLIPPING THE SURELY BONDS OF EARTH

THE CHASER rose easily as they raced over the last of New York and crossing into Vermont. In fact, Tom was a bit surprised at their climb rate as it was nearly twenty percent quicker than the previous tests. He began making a few *hmmmm* noises.

“You sound worried, skipper. Anything wrong up there?” Bud asked.

With a small shake of his head, Tom replied, “No, just going up faster than anticipated.”

Now, Bud laughed. “That’s not surprising since the last pair of flight tests you did on your own were with the landing gear down all the time. I brought them in before we’d even crossed the eastern wall of Enterprises. No drag gives us some pretty nice flight characteristics.”

Tom blushed at having forgotten that simple fact.

Soon, they turned to the south-east so as to get on the correct latitude to make the flight rules. The 30th parallel ran through the top of Florida but the rules allowed them to reach it out at the 60th longitude or about directly below Halifax, Nova Scotia.

Their course kept the sun well within an angle to give them excellent power generation, and Tom was quite pleased to see just how much the combination of Tommy’s solar material, the skin materials from Enterprises’ Solar team, and his own photonix receptor plates on the wings were generating. What was most enjoyable to watch were the numbers coming from Tommy’s generators.

The *Solar Chaser* scooted over the eastern part of Massachusetts and then passed over a small area of Rhode Island before heading out over the Atlantic.

Both young men had to laugh when they took a look down only to see the ghostly image of Tom’s trans-Atlantic HydroTrain heading across the continental shelf on its way to deeper water between North America and France. He was tempted to follow it a little but knew such a diversion would take valuable time away from their flight and that time might be needed later on.

So, with a little wave he looked forward to where they were heading. The morning skies were filled with many jets traversing north and south as well as to the east and west. Most would be

filled with people who had risen that morning to go somewhere vitally important to them, while some of those coming across the ocean would have boarded around midnight their time for a “red eye” flight to the U.S. or Canada.

“They even get pretzels and small cups of cola,” Bud commented as he watched the criss-cross of contrails that were still mostly above them.

Tom made a radio check with Enterprises and then with Eastern Control.

“Roger, Swift Two. Please be advised you will be crossing forty miles in front of an incoming from Germany in about eighteen minutes. Can you rise one thousand feet? Understand you are part of the solar race today.”

“Eastern Control, Swift Two. Affirmative on both the race and ability to increase altitude. Taking action now. Do you wish a report once we are at new altitude?”

“Negative, as long as you continue to squawk. Good luck with the race! Out.”

They reached their new altitude three minutes later. Tom could have sent them up that distance in under a minute but preferred to not use too much power if possible.

On schedule, the massive double-deck airliner passed below them, flashing their landing lights three times a few seconds before as a salute to Tom and Bud.

“Looks like a lot of people know about this race,” Bud stated.

“Yes. According to George Dilling, he had to submit a three-page press release with all of your and my personal data and a bit about the plane. The X-Prize committee released all that yesterday so it hit late news and all the papers and the news broadcasts this morning.”

“How many of the entries do you think actually made it into the air?”

“Not really sure. Maybe dad knows.” He made a second call to Enterprises and as soon connected to his father’s desk.

“Well, from what I’ve read it appears eleven of the nineteen planes got in the air within the first forty minutes of their local eligible time, and two others were delayed by about a half hour by cloudy skies, and only six are not up there in various spots around the globe.” Those six were in places where they needed to wait for the sun before taking off. Their time and speed would be computed against everyone else’s.

After reading off some of the information from the gauges Tom signed off.

They passed nine hundred miles to the southwest of Bermuda and began their sweeping turn to run along the 30th parallel. It would see them crossing into Africa over Morocco before heading over Algeria and the recently democratically controlled Libya.

But, that was hours ahead of them.

Both men had been so excited to be starting the race they barely ate breakfast, so when two P.M.—Shopton time—came they were ravenous.

The *Solar Chaser* featured one special battery located at the top of the fuselage directly behind Bud's seat. It was one of the new ones Tom had developed for Mars and the charging dome stuck up above the skin of the aircraft a couple inches. Its sole purpose was to power a small microwave oven to heat food and beverages for them.

To get to it, and the ice chest with their food, Bud moved his seat forward the five-inches it could travel, and swung it to the right until he was looking directly out the side of the plane.

"We have cold sandwiches and some things like breakfast burritos, lasagna and chili, and a curried chicken or teriyaki beef over rice for hot stuff," Bud said to Tom.

Both decided on the lasagna, so Bud pulled two of the packs out and put one in the oven. It was so small all it could handle was one at a time cross-wise, or one mug of coffee, tea or cocoa standing upright in a special recess. It used less power than a home microwave, but still depleted the solar battery by about a third in heating their two meals.

That would recharge in about an hour.

After closing everything up, Bud swung back around and handed Tom's food over the seat. They ate in silence with the radio in the background.

It was coming up on another radio check period—they were scheduled to be seventh—and both heard the first five reporting all was well and they were on track. One entry, from France, reported they had experienced a circuit breaker failure, but believed they had things under control and would be continuing.

That was the entry Tom knew they were scheduled to pass within two miles of at around two-thirty in the afternoon.

Tom made their report. It was brief and had them showing they were ahead of schedule by nearly fifteen minutes.

Bud, in back, smirked at that announcement. According to Tom's computations they could beat the thirty-six hour schedule by at least one and a half hours.

They passed the French entry earlier and closer than anticipated. In fact their separation was less the one thousand feet horizontally and perhaps one hundred feet vertically. When Tom called on the general frequency to suggest that might have been cutting things a bit, the French pilot informed him they were having troubles with their altimeter and believed they were a full two thousand feet higher.

The inventor gave then his readings and they agreed his must be correct and would be heading higher.

He had been at the controls for nearly nine hours and Bud finally reached over the seat back and tapped him on the top of the head. "My turn, I believe, but you have to give up control."

In truth, Tom's thoughts had been drifting and he now recognized how dangerous that could be, so he pulled back on a lever to his right and all control functions were sent to Bud's station.

"I'm going to take some notes," he declared before Bud suggested that their agreement was for sleep first unless it was an emergency.

"Okay, *mother*," Tom said a little sarcastically, but he pulled out a night mask and put it over his eyes. He was asleep in minutes.

With Bud at the controls they made their approach and pass over Morocco and Algeria before they hit bad weather. According to air control it extended above their height limit and ran all the way to the ground, and went too far north and south to comfortably get around.

And, it was getting darker with the sun now far behind them and the land below was experiencing nighttime.

He worked them up and down until he located a seam of relatively calm air—winds were less than forty knots hitting them from the left—and very little downdraft to overcome. As he checked his instruments he saw, with some relief, they were sitting at nearly 100% power in the batteries and the consumption gauge looked as if it didn't want to measure any use.

About an hour later he spotted that they were down to 92%. And, that was fine. According to his mental math they would catch up with the rising sun in less than six more hours and



ought to still have better than 50% power “in the tank.”

He settled down into looking over Tom’s seat at the expanse in front of them for any tell-tale lights from other aircraft. Far overhead he spotted several jets plying their way from north to south and a few small aircraft lower to the ground than their current thirty thousand feet.

Algeria was soon behind them and Egypt crept by below. Cairo was ablaze with light that ran south for a hundred or more miles along the Nile basin. To his north he could see the shore of the Mediterranean and the city of Alexandria almost as brightly festooned as Cairo.

It was with some sadness he detected some artillery being fired inside Jordan as they passed over the southern tip. Fighting in that region was decades old and got neither party anything other than death and destruction and all at great expense.

As they crossed over Saudi Arabia Tom woke and took back control while Bud made their evening meal. The flyer opted for a couple ham and cheese sandwiches while Tom asked for the teriyaki beef over rice Chow had packed for them.

This time as they ate there was a lively discussion about the plane and what Bud had spotted below. And, the bad weather.

“It sort of joggled me awake for a few,” Tom admitted, “but you obviously found the sweet spot because I must have been back asleep in minutes!”

“Just one of the many courtesy services from Air Barclay,” his friend sang out.

All along the way Tom or Bud made their every-other-hour checks with the X-Prize officials. From the latest round they found out the French entry had to set down in Florida due to equipment failure and that the entry from Taipei, in Taiwan was due to cross their path in another hour.

A few other entries reported various troubles and one, from Mexico, was asking for permission to fly below the altitude limit until they could recharge their batteries. “We believe we can continue if we are allowed to descend to five thousand feet and lower our speed. Do you concur?”

They were asked to wait a few minutes, and when the radioman came back on he said they could have a four hour window at the lower altitude but would then have to get back up and then accept a short time penalty as dictated by the rules.

Three of the entries had taken off from various South

American locations and so were flying along the southern 30th parallel. Everything seemed to be going all right with them, and they would never be a navigation problem.

Given the close encounter with the French plane earlier Tom radioed to the Taiwanese aircraft asking for their altitude. When they hesitated he told them why.

“Oh. Sorry for distrust but we are flying behind schedule because the government of China declared we must use a narrow corridor that took us south of Hong Kong and put us off schedule. We were afraid this might be another attempt to interfere. Sorry. We are at altitude forty thousand feet and hope to maintain until the sun catches up with us.”

Tom thanked them and said he would remain under thirty-six thousand feet even though he'd been asked by the government air controllers of Iran to fly higher if possible.

“That's why we are flying opposite of all but two of the others,” Tom said to Bud, but when there was no response he guessed the flyer had dropped off.

As the *Solar Chaser* was now nearly a full hour ahead of schedule, Tom passed under the Taiwanese entry early, but by about six thousand feet. He and the pilot of the other aircraft exchanged pleasantries on a side channel meant for aircraft-to-aircraft radio traffic.

And then, they were hundreds of miles past each other.

Eastern Pakistan rolled under them as the sun came up forcing Tom to raise a special filter sheet to cut the glare. It was the only way for him to see in front of them and also look at the gauges.

They crossed over India before having to take a scheduled detour up and over Burma. The government was in turmoil and nobody in that country could guarantee complete safety of any aircraft overflying their borders.

As the flights progressed Tom and Bud heard and gave reports on their progress and status. For the most part about every two-hour cycle another entry was forced to land and thus remove themselves from the contest. Most problems had to do with having enough power and all such entries were taking the “follow the sun” east to west path. Planes like the *Solar Chaser* that were flying opposite—there were four others of the original group—were not having power issues, but one plane was damaged trying to get out of a sudden storm and barely made it to the ground without crashing.

In his hand-over report Bud had mentioned his belief they would have just over 50% power by the time the sun started to recharge everything, and Tom was only slightly curious when he saw it was at 46%. Assuming the batteries recharged fully they would have no issues with making it to Shopton before the second darkness would overtake them.

As had been the case with the Taiwanese entry, the Chinese government radioed the *Solar Chaser* ordering them to skirt south of Hong Kong. It bothered Tom a bit to know they had placed no such detour orders on their own entry and a radio call to the X-Prize people told him it was out of their control except to penalize the Chinese entry with a two-hour handicap to place everyone on a level field.

As soon as the Chinese heard this they rescinded their demand and Tom and Bud proceeded to pass over an area south of Shanghai, some thousand miles to the north and still close to the 30th parallel.

While the Taiwanese pilots didn't protest he hoped the committee would give them some slack in their overall time based on the extra distance they were forced to fly.

It was during the twentieth hour of their journey that Tom received a message from Harlan Ames on a private radio frequency.

"Tom? Glad I got to you. There is a situation down here, or rather out in British Columbia. The Mounties have found Robert Whitcomb, and he is fine other than having been kept drugged on and off for at least several months. He is in the hospital in Victoria until they can arrange air ambulance transport to Vancouver."

"That's great news. Has he been able to tell anybody what happened?"

"Only that he was waylaid by his son-in-law—and he never said who that was before he lapsed back into deep sleep—who showed up at his house the night of the announcement about his coming back to the company. The man was angry and pretty soon tackled Whitcomb and knocked him to the floor where was given some sort of shot and that is about where his memories stop."

With little to say or do, Tom asked that they be kept abreast on any new developments and signed off.

As hour twenty-four came and went, nine of the entries had dropped out.

Tom happily realized the two young women from Florida were still in the hunt for the prize. He and Bud had passed them just about dawn and were now ahead but didn't know by how much.

Bud had been keeping a log of all reports on all the other planes and updated his friend on their status versus the others.

"We are one-hour-fifty-one minutes ahead of track. The next closest plane is the Ocala, Florida one and they are five minutes ahead of schedule. Everyone else ranges from about twenty minutes slow to over six hours for the entry from Ukraine."

He suggested it was about time for the pilot changeover but offered to play chef once again. "It isn't as if you can crawl back here and do it," he acknowledged. "Sandwich, stew, hot dog or one of the breakfast burritos you passed on earlier?"

Tom woke up from his four-hour mandatory nap but felt terrible, almost as if he had not managed any sleep at all. He stretched and decided to see what was around them while he woke up.

Rather than burden the electrical system for something he thought only might be used a few times, he quietly pulled their battery-powered RADAR device from the bracket under his seat. It was about the same size as his e-gun—looking basically like a futuristic pistol—and had two settings: WEATHER and SOLIDS.

He moved the thumb switch to the left and could see no dangerous weather within fifty degrees or three hundred miles of their position, then thumbed the switch right to SOLIDS and pointed it at the front of the canopy.

"See anything out there?" Bud asked, slightly startling Tom as he believed his friend thought he was still asleep.

"Nothing right now, flyboy other than what I believe is a heavy airliner traversing from maybe Australia up to Japan or South Korea. I should have put a small IFF chip in this thing to ID aircraft out there. Oh, well... next around the world race!"

He was about to set it back in place when a glint of sunlight far ahead caught his eye. He brought the device back up and pointed it that direction.

"Incoming, Bud," he said in a level voice. "Maybe a hundred feet above us, so let's take it down a thousand feet. Whatever it is will pass just about directly overhead in two minutes."

But, as Bud dropped the airplane's nose and they lost altitude, Tom saw, with dismay, whatever it was out there was matching

their descent.

“We might have a problem here, flyboy. Whatever that is wants to be in our airspace. Get ready to evade... I’ll give you the where and when.”

“Okay, Tom. Wish you were able to run the RADAR and could take the stick, but say the words and I’ll put us wherever you want.”

The inventor kept taking sightings and soon had a good idea what was happening; as they traversed west to east the other aircraft was coming down from about zero-three-zero heading south-southeast.

He began calling out numbers and Bud prepared to make a sudden dive to avoid a collision.

“Get ready to nose down and come left about thirty degrees. If we time this right they can’t respond. Uhhh, in about fifteen seconds...”

Now!” he shouted when the time was right and the plane made a sudden turn and drop. But, at the last second Tom stared in horror as something fell from the underside of the other aircraft, was blown open as if by an explosive charge, and a heavy mesh net dropped directly in front of them!



## CHAPTER 20 /

### CHASING WHAT'S KEEPING YOU UP

BUD SHOVED the stick as far forward as possible, and the *Solar Chaser* was only slightly impacted by the spreading net. As it was, part of the net caught on something on the right wing and hung there a moment before snapping off and flying away behind them.

The mystery attacker zoomed off to the west and soon was gone from sight.

“She’s acting really stiff, Tom,” Bud said as he wrestled with the controls. “I think something got bent out there. Look at the leading edge of the starboard wing, about twenty feet out.”

Tom did and his heart sank.

The leading edge flap out there had been yanked up and bent, probably to the point where it would be useless. Worse, it was catching a lot of air and would be slowing them down.

Now completely awake he got on the radio sending a signal up to the Swift’s network of satellites.

“Get my father on the line, please. It’s sort of an emergency,” he told the radioman at the old Outpost in Space that was acting as the relay to ground station.

When he told the older inventor what had just happened and their predicament, Damon asked if they could continue or needed to pull out and limp to a safe landing place, possibly Hawaii.

“We’re down about fifteen knots, but almost two hours ahead of schedule. Wait a sec—” He spoke over his shoulder, “How is it handling now, Bud?”

“Still stiff, but I have good command of everything except the front flap. That looks like a no-go from now on.”

Tom re-keyed the radio, “Dad? We have control and it looks like we are in one piece. My gauges are looking good, so we’ll continue, but please contact the X-Prize people. Tell them we were attacked and it would appear from the configuration of the plane that dropped a net in our path that it was another entrant. The Whitcomb entry. Couldn’t get a look at the pilot because we passed underneath, but it had their unique tail design that angles down about twenty degrees.”

Damon swore and it came over the radio. “Sorry. Forgot to let

the key go. Okay, I'll get on this and I'm going to ask them if we can send the *Sky Queen* out to escort you in case of emergency. Or, another attack. I'll be back in twenty minutes. Good luck, Son."

Twelve minutes later he was back. "Unless you are declaring an emergency and dropping out, the answer on the escort is 'No.' Sorry, but they are pretty determined this is to be an all-on-your-own race. What do you want me to do?"

Tom thought a minute. "Okay. Send her out to San Francisco and tell her to wait in the vicinity. We can make it that far, passing a few hundred miles to the south, I'm just about positive, but I'd rather she were closer to us than out in Shopton."

Five hours later they spotted the West Coast of the U.S. and Tom let out a sigh of relief. Bud had argued that he didn't need sleep, but Tom told him to take a nap and had been piloting them for nearly that entire time.

His right arm was nearly exhausted trying to keep control of an aircraft that wanted to judder and spin slowly in the direction of the damage. To overcome some of it he had cut back a little on the left turbine and upped the right one to maximum revs, and while it helped some, it did not fix the issue.

Bud woke up and yawned. "A question came to me in my sleep, Tom. How the heck could that have been the Whitcomb plane? We were four-fifths of the way around the globe and given that they took off heading toward Asia, they ought to have been somewhere over France at the time we were attacked."

"Yeah, that's been bothering me a lot, too. I'm going to give dad a status check and ask him what he thinks."

When he raised the question, the older inventor said it was quite a good one. "It would mean they haven't actually gone around the world but have stayed around there in order to attack you. The X-Prize people say Octavia Dale and her co-pilot have been sporadic at best in reporting their positions and something fishy is going on with the relay stations their calls have gone through. There is no sign of them behind you, is there?"

"Nothing we've seen anywhere around our present forty-six thousand feet altitude, Dad. Oh, and we are about to cross the shoreline of California ninety miles south of San Diego. We'll be turning northeast in another hour. Tell whoever is in the *Queen* to stand by and not follow us until we get to around Kansas."

Bud was about to suggest he take back the controls when a sudden up-draft hit them sending the plane nearly vertical for a



few seconds. It took three long and scary minutes for Tom to get control back and get them flying on an even keel.

“Well, we went up a couple thousand there, flyboy and dropped about six thousand. But, things are no worse than they were before. If you want to take it for the next hour or two I’ll gladly let the blood flow back into my arm and hand.”

The sun was two hours from setting as Tom and Bud crossed the New York state border. They had traversed Pennsylvania from south of Harrisburg up to Scranton and just passed over Hancock.

The *Solar Chaser* was still plagued after its encounter with the Whitcomb Aeronautics plane. It seemed the other entry had gone out of their way trying to destroy or cripple the jet with Tom and Bud, and it was only by great flying on Bud’s part the netting the other plane ejected in front of them failed to completely entangle the Swift plane. It had, however, done some damage to the right wing and Tom and Bud had fought it for about ten hours.

A new and violent downdraft dropped the plane nearly two thousand feet lower in less than half a minute before they flew out of its influence and Bud regained control.

“Uhhh, skipper? I’m suddenly seeing that same battery drain we had during the test flight. You don’t suppose that net thing tore out another of our cables, do you?”

Tom let out a groan. *So close, and then this happens!*

“If that’s the case, it might have started back then, but that last shaker yanked it out all the way. Get on the radio and let both Enterprises know as well as the X-Prize folks that we are possibly in trouble. Make certain you register with them both this has something to do with the attack that the Whitcomb pilots will no doubt vigorously deny.”

As Bud made the calls, Tom took back the controls concentrating on flying and computing their situation.

If they could maintain their current speed, they would make it to Shopton with nearly an hour to spare. If! He tried to recall any useable airfield along their path should it be necessary to set down. All he could conjure up was the small county airstrip to the immediate east of Johnstown. He made a note of its location and went back to computing their power situation.

When Bud completed his calls—the one to the X-Prize folks had been met with skepticism (“How could the supposed attack

have done this so many hours later?") but with the promise to have an investigation started.

"Their entry last reported in three hours ago, and they have missed at least one since. We've called them on their private frequency and told them they have ten minutes to report or be disqualified. That's all we can do. Good luck."

"What's the status, skipper?"

"Well," Tom replied as he set the throttle down five percent, "remind me to regret keeping all our power lines going through the one long circuit that drains everything if we get damaged. Oh, and we're passing over a little town called Meridale and have about two hundred and five miles to go. If we keep up the new speed I just set, we'll make it all the way to Pottersville before we set down in Lake Carlopa. It won't be home, but it will be darned close. I wonder if the rules can be bent to include a nearby landing spot as opposed to the originating field?"

Bud offered to make the call. Tom hesitated, but told him to word it such that it might be an emergency landing, but would include about as many total miles.

"In fact, tell them that because of the route we took part of the way over China, it will technically be thirty-nine miles farther than necessary."

Bud was asked to hold while the committee pondered the request. During this time Tom set the throttle another five percent lower, their speed now dropping below four hundred knots.

"I hate to keep nattering in your ear, Tom, but how's it looking?"

"One sec—okay. We can slow down even a bit more, maybe by forty knots, and still make it in time. The issue is where will we touch down, and it still is looking like that won't be Enterprises. I wish we had some back-up power."

"Cut out the heaters," Bud stated. "We're still warm enough and the batteries are not going to magically feel better for a little warmth. And, if need be can we make a turn into the setting sun for a few minutes and get some power to help us home, or will that be counterproductive?"

"Probably not do us much good, but the heater thing is an idea." Tom flipped a couple switches and the entire heating system shut off.

Fifteen minutes later the radio crackled to life. "Swift entry? We cannot allow an alternate field unless the primary one is

closed. Can you confirm closure of that field?"

"Wait one," Bud responded. He quickly turned to the Enterprises frequency and was about to relay the request.

"Swift Two. Be advised we have agreed to allow an emergency landing of a Boeing 777 with one engine flame-out and fire. Require you to find alternate landing field. Enterprises is closed."

Switching back, Bud told the committee's radioman about the emergency landing.

"Roger. We heard about that from the FAA just one minute ago. So, you are cleared for emergency landing at the airport in Pottersville, although we don't see that on our charts. Report when down. Out."

"Okay, Tom. We're cleared, but what are you going to use as a landing strip? I know most of Pottersville, and other than the rail line up to the car company I can't think of any place that is straight, open and suitable for a landing."

Up front Tom was both worrying and slightly smiling. He finally answered Bud's question.

"You know the boat ramp off of... I believe it's Glendale Road?"

"I think so..."

"Well, that empties down into the lowest part of the lake and it is only eight to ten feet deep, and there is about eleven hundred feet of straight water until it takes a right turn, but we ought to be stopped before that."

Tom kept dropping their altitude all this time and they'd passed over the small town of Wevertown placing them thirty miles from Pottersville and almost fifty from Shopton.

Just as Tom was taking a breath to tell Bud they were going to make it, the sun broke through the later afternoon clouds and hit the *Solar Chaser* like a beacon.

There was enough direct light on the left side of the aircraft to actually stop the decline in the power level in the batteries.

Not wanting to jinx things, Tom cautiously took a look out the left side of the cockpit. His smile widened as he saw no clouds in the sky that way that might diminish the amount of light from the setting sun.

Bud felt a tingle go through his body as he realized what this might mean. Even if the entire connected system was failing, at least the turbine on the port side could keep working a little.

"Can we get all the way home on that?" he barely whispered.

Rather than directly answering him Tom instructed him to call the Construction Company. "Tell them we're coming in using them as our emergency strip."

It was now a battle between distance, travel speed, battery power and time. Tom ran mental equations about once a minute trying to determine their situation. Even Bud realized he was so heavily concentrating he said he'd take the control stick for a few minutes. Tom grunted his agreement and the appropriate lever was moved giving Bud command.

Pottersville raced beneath them at about one thousand feet. Now, Tom wished he'd had more faith and kept them at about four thousand feet. Not only would it mean a minuscule amount more of photons hitting the aircraft, if necessary they would be able to use the plane as a glider for as much as four miles. Now, the best they could hope for was one extra mile if the power failed.

They flew out over the lake first passing the boat ramp and then the little island just outside the small jetty of land that marked the actual lake, and then they were over the deeper part of the water.

If they set down now, and sank, it would be in over three hundred feet of water.

"Try to keep her close to the left shore, Bud. That way we won't have so far to swim... in case."

Bud held their altitude and moved left and right with the shape of the shoreline until they neared the halfway mark up the lake.

"Let me take it again," Tom requested taking command. "Six percent power left and three miles to go. I'd say we're going to make it!"

As Bud let out a small cheer, Tom turned them slightly to the port side slipping over the shore and then straightened them up for a direct approach to the small runway at the Construction Company.

"Half mile and three percent..."

"One thousand feet and two percent..."

His next report never came as the wheels were popped down and locked into place seconds before they touched down.

The *Solar Chaser* rolled nearly three-quarters of the way down the runway before coming to a stop.

"No more feet and almost no more power," Tom finally stated.

“We did it, Bud!” He felt tears come to his eyes the relief was so great.

“And, in twilight, too,” Bud told him.

“Huh?”

“Look,” the flyer suggested pointing over Tom’s shoulder at the outside.

To the inventor’s surprise it was indeed nearly dark. To make matters worse, this airstrip did not feature night lighting.

“I must have had the lights on,” Tom said.

“Nope! You were concentrating so much you probably willed the light to stay around until we touched down.”

As they climbed from the cockpit of the depleted aircraft a truck came along their left side. From the back doors poured Bashalli, Sandy and Mr. Swift. Anne Swift got out from the front passenger side and Harlan Ames from the driver’s door.

The young men accepted hugs and kisses and more hugs and kisses from their respective wives, a hug from Anne Swift and handshakes from Damon and Harlan.

After a few moments Tom could see his father and Harlan wanted to have a few words, so he suggested Bud drive all the ladies back to Enterprises and then return for the three men.

As the truck drove off the three started walking toward the main building cluster.

“Great job, son, and congratulations! We sent word of your landing just as you hit the asphalt and the X-prize committee has declared you to be the presumed winner pending verification of your route tracking. Of course, the Florida entry is a very close contender. Nobody else came close, but we’ll know tomorrow.”

“So, we beat Whitcomb’s entry, then?”

Harlan stopped and touched Tom’s forearm.

“About their entry. First, their pilot was Octavia Dale, born Octavia *Whitcomb* and married to the man we all thought was Whitcomb’s son, but turns out to be the wanted man, the fugitive Shieler Glodis, AKA Skylar Dale, from Brazil who took over running the company against old man Whitcomb’s wishes. He’s also the one Robert ID’d as his attacker.”

Tom could only nod.

“That brings up something very uncomfortable, Son. It would appear that helicopter they wanted us to test was actually meant to kill or incapacitate someone here. It was Octavia Dale’s idea to

try to pump some life into their failing company by making a huge insurance claim for several million dollars. No doubt she would have disappeared with the money and her husband leaving her father to take the fall.”

“But, what about the recent attack? They beat our entry date. Surely they couldn’t have known about the X-Prize before we did?” Tom objected.

“And, they didn’t. The contest was just another piece of fortune they believed fell their way. An opportunity.”

As they walked on now heading for the main gate Harlan told them a few more things about Whitcomb and their situation. But, Tom wanted to know something else.

“What about their aircraft? I want it impounded before they can destroy it and hide the fact they attacked us as we passed them over the Pacific.”

Harlan shook his head. “Won’t and can’t. They radioed some sort of catastrophic failure and sent a brief Mayday about thirteen hundred miles from their home airport and were reported to have spiraled into the sea. It sort of proves they were not in the contest to win but to attack you. A jet from Seattle to Tokyo was diverted to look for wreckage and reported nothing in the area. No wreckage, no ships to pick them up if this were planned... just water.”

“Who was her co-pilot?” Damon asked.

“Her husband and co-conspirator. Now the company will either die, or Robert Whitcomb will take the reigns for a while until he can find someone reliable to take over. I hope he makes a go of it. He’s is actually a very nice man, Oh, and the other news from Robert himself is he is feeling fine and wants you to take a stab at fixing their helicopter design. He believes it can save his company. If, that is, you are willing to take that on and can put the attack behind you.”

“Bud might have a lot to say about that, but I’ll think the offer over. I hope he isn’t looking for an immediate answer from me.” Tom thought about something else a moment before something struck him. “But, if they were out over the Pacific waiting for us, they never did circumnavigate the world, did they?”

Harlan shook his head again. “No. And, their sporadic radio contacts, coming through some very iffy repeaters, bears that out. I believe their intent was to use the contest as a way to attack you and Bud. They may have taken off under cover of darkness and circled back around to wait for a full day. The RCMP impounded all the company records roughly an hour ago, and

once they get reading it, my guess is they will show the airplane wasn't even fully solar powered. They might have begun that way to pass the inspections, but they must have added an auxiliary engine of some sort after the final check."

"What about that biological attack," Tom asked.

"Well," Harlan responded, "when the Mounties took over Whitcomb's headquarters and factory they also found evidence of that biologic agent and a set of about a dozen small wooden speedboats of the size necessary to launch a rocket like the one we found on Fearing. And, of course, a corresponding number of rockets similar to the crashed one we found."

They said no more as Bud was just pulling up to take them back to Enterprises.

Even though the young men were tired, it was still early enough they enjoyed a fine steak dinner in the Executive dining room at Enterprises half an hour later. Along with family were the main individuals who had worked long and hard on the *Solar Chaser*, and Damon believed they all deserved a bit of a party.

While they ate Bud leaned over and asked, "Do you think Octavia Dale is really gone? I only ask because we've seen other bad guys spring back to life before."

Tom shrugged. "I don't know and I don't want to think about her... not for a long time. Let's eat and enjoy our possible victory."

For more than an hour everyone had a grand time and then someone suggested Tom and Bud give speeches. Bud shook his head and looked at his friend.

Tom motioned for a microphone and remained sitting while he told them a few of the more interesting things they had encountered.

"I will say we have one great weakness that has almost caused two crashes and that is my design fault; everything goes through one power circuit without redundancies. That includes the main wiring harness and connector that sits just in front of the flaps on both wings. It comes undone and then leaks power into the air like it is a funnel. We don't have the option to reroute and keep a lot of the power working for us. Assuming we fly her again I want that replaced with a hard-wired cable protected and glued in place." His smile told them this wasn't a rebuke but more of a reminder that nothing was absolutely foolproof, not even in the world of Tom Swift.

Damon and Anne suggested they drive the four home dropping Tom and Bashalli off at their house to take Bart and Mary off Grandma Prandit's hands before continuing on to drop off the Barclays.

Bashalli asked Tom to, "Just go up and take a shower. You smell very bad!" He could not argue with that. The only thing he and Bud did on getting back to Enterprises was to make a short detour to the apartment next to Tom's lab and remove their adult undergarments and clean up a little. That had done nothing for their sweat-soaked shirts.

By the time he was washed and in his pajamas, Bashalli was reclined on their bed in her nightgown waiting for him.

Her smile told him she understood he was exhausted and that she only wanted to be close to him.

As they cuddled under the covers she asked, "Was that a good adventure, or was it a bit too tame?"

In a groggy voice, he answered, "It was just a couple days of flying around and coming home to the woman I love. 'Night, Bash."

"Goodnight, Tom. I love you even if you are now snoring and cannot possibly hear me. I only hope that you will be around for the next few months. I have no idea what will come up, only that I want to have you home. And, we need to talk about the vacation..."

Even had Tom been awake and thinking there was no way he could imagine what was to enter into his life in the coming months as he designed, built and fought to operate a new type of food farm.

But, for this moment his mind registered the warmth of her body against his back, and he smiled.





