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A SWIFT ENTERPRISES INVENTION STORY

Tom Swift and His Ultralight ReconoJet

By T. Edward Fox

The U.S. military has been attempting to switch to unmanned reconnaissance drones for many years, but the truth is that there still are some instances where a high-altitude overflight with a human spotter can make a difference. With funding at an all-time low, Uncle Sam turns to Swift Enterprises.

After receiving assurances that such aircraft will never carry weapons—other than defensive missile-defeating and electronic counter measures—Tom Swift gets the go-ahead from his father to tackle the project.

But, what he begins to develop and what he ends up creating are very different things indeed. But, will his new ideas fly with the men and women who control the money?

This story is dedicated to anyone who is told to “cut the costs” when they know that doing so isn’t the best thing for whatever they are attempting to do. The good ones do it the wrong way, hope they aren’t made the scapegoat, and then show how it can be done correctly. Carry the fight against ignorant bureaucracy, guys!

Tom Swift and His UltraLight ReconoJet

FOREWORD

As the saying goes, there are only two things that are assured in life: death and taxes.

Well, that's all fine and dandy in the personal world, but in the business world, and particularly in the world where the Government likes to go for those "lowest bidder" projects, I believe there is a third assured: death and taxes and idiots who have no idea what they are doing—much less what is necessary to do something correctly—being in charge of making decisions.

Now, while the idea of getting the lowest possible bid on, say, an aircraft carrier is going to save we tax payers millions, we often end up paying more to "tweak" what we get—a misnomer for having to redo a lot of stuff that is substandard because of that same low bidder mentality—than it might have cost to do it correctly the first time around.

And that is what Tom faces in this story. Once he sees the specifications he knows that they are not correct, but politics dictate that he do it the government way.

I don't know about you, but I've been there and would gladly take a large stick and beat a few of those idiots around the head and shoulders until they: a) cried like little girls, and; b) saw things in a more realistic light.

That is why I write and Tom Swift invents, and not the other way around.

Victor Appleton II

CHAPTER 1 /

SHOULD WE, OR SHOULDN'T WE?

TOM SWIFT picked up the ringing phone. "Hello. Tom here." For the next ninety seconds all he did was listen as first a female voice asked him to 'Please wait for the Senator,' and then the end of a slow rendition of *Copacabana* played on an accordion followed by the beginning of *The Washington Post March* played on the pan pipes.

He was tempted to hang up ready to believe that his best friend, Bud Barclay, might have decided to play a little joke on him, except that the caller ID stated "U.S. Senate."

Finally, a deep voice with a southwest accent came on. "Tom? It's Senator Quintana. How the heck are you?"

Tom was relieved. The Senator was a good friend of his father, Damon Swift, and one of the politicians who was very pro Swift Enterprises. Over the years, Senator Quintana had not only helped them when other politicians were bent on making trouble for the Swifts, he had also been instrumental in seeing to having Enterprises involved in contracts and project requests that others might not have believed them capable of.

"Senator," Tom said brightly. "How nice to hear from you. It's been a few months. Since you apparently asked to speak to me I won't give you the 'let me go get dad' thing. What can I do for you?"

"Listen, Tom. As much as I love your father, you and I know that he has a little blind spot when it comes to military contracts. Now, while I can respect his desire to not build weapons or even systems to deliver weapons, he—and I trust that I can rely on your desecration in not relating our conversation to him—he sometimes passes on project that I

just know Swift Enterprises is right for.”

Although Tom disliked keeping things from his father, he realized the truth in what the Senator was saying. “Well then, sir, I assume that this call might be about one of those sort of projects. Is that it?”

The Senator chuckled. “Yes, Tom. And, to tell the truth, it also is not about that sort of project. Because of the secret nature of this I’d like to get you down here to D.C. to tell you about it directly. Is there any chance you could slip down this afternoon?”

“Let me look,” Tom told hi, while calling up his calendar on his tablet computer. “Well, as long as I can come down for a three o’clock meeting and be back at the airport by five, I can make my dinner date and keep my personal life from hating me.”

“And, how is the delightful Miss Prandit?”

Tom’s girlfriend of the previous two years was the beautiful Pakistani Bashalli Prandit. She had emigrated with her family shortly after turning ten and had met Tom just before turning twenty, and on the eve of his first flight in the Sky Queen.

“Bash is just fine, Senator. She’s just feeling a little neglected this past month what with my being up on the Moon for bit and then down at Helium City. Anyway, that’s not your problem. Will three work?”

They agreed on the time and the Senator bid him goodbye.

Tom pushed a button on his phone. “Trent? Can you call reschedule my four o’clock meeting with Hank Sterling, please?”

“Certainly, Tom,” came the crisp voice of Munford Trent, the secretary Tom and his father shared and who kept both of their calendars in order. “Any new time?”

Tom looked at his version. “How about tomorrow morning at nine? Tell him I’ll come over there and bring coffee and donuts as a peace offering. Oh, and can you mark me out as of one today? I’m heading down to Washington D.C. for a quick meeting and be back around five thirty.”

“And if Miss Prandit calls...?”

Laughing, Tom replied, “Tell her that I will pick her up, *as scheduled*, at six-forty-five.”

He next called over to an office located in one of the hangars that covered a large area at the northwest corner of Enterprises. “Hey, Bud. Want to come down to D.C. with me?”

“What’s up? They finally giving you a Presidential citation or something exciting?”

“Nope. Just a meeting, but I’ve got a lot to do and if you can fly me down I can keep working in the air.”

At one, the two young men climbed into a Swift SE-11 commuter jet, nicknamed the Toad, and took off. Tom climbed into one of the rear seats, and Bud didn’t disturb Tom for the fifty minute flight. As they descended, Tom came back to the co-pilot’s seat and eased himself into it.

“Finished with your paperwork?”

“Almost. I’m trying to come up with an improved propeller for the *Super Pigeons*. Dad would like to offer a supercharged version with a higher ceiling and another eighty or one hundred knots speed.”

Bud whistled. “Wow. And I thought the sixty knots improvement over the old *Pigeon Special* was a nice touch. So, how are you gong to get that sort of speed out of a prop plane?”

The four-seat *Super Pigeon* was the second generation of the private plane that had helped put Enterprises on the map.

Newer manufacturing techniques and stronger materials had allowed Tom and his father to make the newer plane more aerodynamic. That, plus a larger yet more fuel efficient engine, had led to the improved performance.

“For starters, we will be using a variation on my Y-4 engine. This one, instead of three sets of four in that upside down Y formation will have five cylinders per arm. That way we get the total displacement down from the current opposing six with its 5.6 liters to a tiny 2.5 liters. Torque increases by almost fifty percent so we can use a larger prop. Plus, it will be air cooled.”

“What about the basic air frame?” Bud asked. As one of Swift Enterprises’ top test pilots, Bud was always curious about anything that flew.

“We’re sweeping the wings back eleven degrees, adding tiplettes for stability and a few other refinements.” Tom had to stop at that point when the airport approach controller needed to vector them in a short spiral turn to allow a larger commercial jet to land in front of them.

After landing, Bud suggested that he would go hang out with a friend and pilot who was working the dispatch desk for his airline. “Poor Jimmy did a Gerald Ford down the steps of his 737 a month ago and shattered his ankle. So, no flying for three months for him!”

Tom was not at all surprised when he came out through the security area to find a driver holding a sign with his name on it. “I’m Tom Swift,” he told the smiling man.

Taking his identification out of his pocket, the driver told him, “Senator Quintana sends his regards and has asked that I get you to the office pronto. Mind if we put n the flashing lights and speed a little?”

Tom smiled.

“Well, Tom,” greeted the Senator when he arrived a full twenty-five minutes ahead of schedule. I see that our Mr. Alexander got you here in record time. Have a seat.” He motioned for Tom to follow him to a conversation area in the corner of his large office. “Remind you of your own office setup?”

Tom nodded and grinned. It looked almost exactly like the group of overstuffed leather chairs and low conference table in his shared office.

“Got to admit I stole the idea from you and Damon. Anyway, here’s why I asked you to come down.” He slid a thick folder over to Tom. “You can take the whole thing with you, so just look over the top seven page summary.”

As Tom read through the description he became more and more interested.

“But, I thought that we’d all but given up on manned reconnaissance aircraft, sir. Drones are all the rage. We even produced that abbreviated run of mach-3 camera drones for the Navy last year. Why the change?”

“Why, indeed. To answer that I have to go back to the days of the old U-2. What we called a spy plane in those days. Even back then we had the technology to fly the things via remote control. Of course, that would have entailed putting a second aircraft up so that line of sight could be maintained, but it would have been possible. The thing is, we knew that a recon aircraft is only as good as its ability to look all around and to assess what it should concentrate on.”

The Senator took a sip of coffee, made a face and set the cup down. “Cold! Anyway, modern drones can only see so much. In tests we have found that a man with a good set of binoculars, or better yet those amazing digital ones you produce, can see and assess a greater area than a three-man team operating a drone

and it's cameras can, and do it in a third the time.”

“Oh. That's why the spec for large view windows. Well, the only things I have to question are the whole weight issue—fifteen hundred pounds is exceptionally light for an aircraft designed to fly at sixty thousand feet—and the propeller drive. Why not a jet?”

The Senator sighed. “The people responsible for writing up the specification are all tied into the notion that a propeller aircraft can fly slower and with reduced fuel consumption. Even you will have to agree that jet engines do consume a lot of fuel.”

Tom nodded. “Sure, but it's very hard to get a propeller driven aircraft that high. I believe that the record is just a little over sixty-seven thousand and that wasn't for very long.”

“I would consider it a favor for you to take a really close look at this project, Tom. If Swift Enterprises doesn't bid on it with something that will meet the specs, then it may go to a company outside the U.S. The French company, Aero Conception Spécialité has already submitted a bid that the people behind this project are leaning toward.”

Tom scowled. “Isn't ACS the company that was accused of trying to sell small bombers to that African country? The one that planned to use them to kill half their own population because their president was insane?”

“Yes. it is the same company, but because they were never formally found guilty of that, and they ultimately did not deliver anything, we can't refuse to do business with them.”

Tom agreed to give the project a good review and to bring the subject up with his father the following day. “I can't promise that dad isn't going to balk at this. He is still a little angry about the mid-project cancellation of the last drone project.”

“All I can ask is that you consider this one, Tom.”

The following morning Tom met with Hank Sterling.

“Got the new propeller design you uploaded last night, Tom. It's quite a little work of art. Are you sure that it's large enough?”

“That's where you come in, Hank. I was hoping that you could build three or even four of these starting with one at just four feet diameter, and others at five, six and seven feet. I would like to use the smallest possible version for the plane for all the obvious reasons,” Tom told his chief pattern maker and the man responsible for prototyping many inventions and then turning them into build-able jigs, forms and molds.

“Sure. Smaller means stronger. Let me see what I can do. Are you tied into the twelve spoke formation?”

The radically-new design looked more like something that should be inside of a jet engine instead of being used as a propeller. Each blade featured an increasing twist the farther out you got, and could be rotated from the central hub far enough to give backward push at it's lowest setting—great for decelerating upon landing—and up to full thrust for take-off power.

At the ends of each blade was a tiplette designed to capture and fling back the air that normally slipped outward and off of normal propellers, and was therefore lost as potential thrust.

Tom had first designed a similar prop to act as an improvement to jet turbine engines while designing his QuieTurbine engines.

“Give me three days for the small one and then a full day for each of the others.”

Tom left, satisfied that Hank would create exactly what he wanted, and headed back to the Administration building and

the office.

“Dad. Do you have twenty minutes right now?” Tom asked as he sat down at his own desk.

Damon hit the SEND key on his computer and turned to Tom. “As a matter of face, I do. Does this have anything to do with your little trip yesterday?”

Tom slightly reddened. He had been feeling guilty about not telling his father about the trip the day before. “Yes, it does. I was asked to come down to talk with Senator Quintana about a possible new project.” He paused a moment. “Uh, he wasn’t sure you would be interested and wanted to get me on his side.”

Damon laughed. “Figures. He *would* do that. So, tell me,” she said, sobering, “what deep dark secret project is it that he doesn’t believe I might want to talk to him about?”

“Basically, they are looking for an extremely lightweight, high-altitude reconnaissance airplane.” Seeing his father’s brow take on a frown, he hastened to add, “It is supposed to be a camera and manned observation platform.”

“Manned? I thought the military had all but done away with those sort of aircraft. And, I noticed that you slightly emphasized the word ‘airplane.’ We *aren’t* talking a jet, then?”

Tom took out the summary document and walked over to his father. “This spells a lot of it out. Take a look.”

Fifteen minutes later Damon set the pages down and looked across the desk at Tom. “They don’t know what they are talking about. You know that, don’t you?”

Tom nodded. “Yes. Those specifications might work if they spelled out a five thousand pound aircraft—dry weight, not fueled—with a good low-bypass turbofan engine. I have no idea what speed they hope to get, but even in I could repurpose the

new propeller I’m developing for the Gen 2 *Super Pigeons*, I doubt that anything much more than one-eighty or maybe two hundred knots is possible.”

“I see that they don’t mention the actual configuration of the airframe. Have you given any thought to what you might suggest?”

Tom shook his head. “I just got this yesterday and haven’t had much time. I think what I need to do is to see if you believe we should pursue this. For me, I’d like to at least give the design a whirl, but I know how you feel we were treated with the Navy drone program, so I’d feel better if you made the ‘should we or shouldn’t we’ decision here.”

The program in question had originally called for two hundred high-speed camera drones capable of taking off from any ship using a small rocket booster and then flying for up to two hours at 2,200 miles per hour taking detailed high-definition videos using an ultra-wide angle lens.

After all of the R&D, the Navy took delivery of the first fifty and then suddenly canceled the program. That left Enterprises holding the financial ‘bag’ for almost a million dollars of purchased but no-longer-required materials.

Tom could almost see the cogs turning in his father’s head as he waited for a decision. A full four minutes went by before his father spoke.

“Do we have assurances that this aircraft is for reconnaissance only? No weapons capability? I realize that any payload would be meager at best, but the airframe still has to lift about five hundred pounds of payload. I absolutely want their assurance that it will never be anything offensive.”

Tom smiled at his father. He well knew his father’s dislike of weaponry and had actually refused to build at least one project that ultimately turned out to be a secret missile platform.

“No weapons, Dad. Even Senator Quintana understands that and will insist that any contract spell that out. If anything, it might carry electronic missile jamming countermeasures, and maybe chaff, but never an offensive weapon.”

Damon Swift nodded. With the Senator’s assurance he felt more comfortable about the project.

“As long as you write the bid to be one hundred percent binding, and as long as it covers both the costs for this project as well as the cancelled one, I guess I can give you a thumbs up!”

CHAPTER 2 /

THE GIANT FAN GAMBIT

TOM COMPLETED the first portion of the bid five days later. He had three weeks to submit the final bid. There had been several points not covered in the specification document that Senator Quintana had been able to help find answers for, but the biggest questions remained.

Why a propeller-driven aircraft, why so incredibly light, and why had no one considered the difficulty of flying at that altitude?

Bud was equally curious. “Is there a quota of fools and idiots that have to be involved in all these Government projects? I mean, it’s one thing to ask for a high-altitude lightweight aircraft capable of... uh, how far is this supposed to travel?”

“They never specified a distance, just a time,” Tom said with a shake of his head. “That’s something else the Senator is going to need to help us with I guess. The figure the document mentions is eight hours.”

“Okay. Let’s say you get this up to two hundred, which means a sixteen hundred mile flight. Did they mention in-flight refueling?”

“Nope!”

“Then they really are idiots. I can check, but if the inward leg is going to be limited to eight hundred miles and the outward leg the same, that leaves zero on site time. They’re just not thinking this one through. So, what are you going to do?”

Shrugging, Tom made a quick note on his tablet and replied, “Time to call the Senator again.”

By the following day he had several answers.

The aircraft needed to fly at a top speed three hundred fifty knots so that it could travel one thousand miles, remain over its observation area for five hours at a reduced speed and then quickly fly out of the area again.

He also found out that the cockpit had to be able to accommodate two people, but would generally be a single occupant aircraft. It also needed to be carried aboard destroyer escort and frigate-sized ships in a folded down state and then launched using a short ramp with RATO—rocket assisted take off—pods attached.

That last one brought up the question of how anyone would recover the aircraft.

The Senator had sighed and promised to look into that particular bit of lunacy.

The next day Tom attended a demonstration of the new FanProp Hank had made. It was a little noisier than the standard two-blade propellers used on the current *Pigeons*, but it also had one amazing property. Eighty-two percent of the thrust produced came from the outer thirteen inches of the blades. What that could mean is the more than twenty percent of thrust lost on typical propellers that flung it uselessly against the front of the engine cowling would be reduced to about three percent. That would be, Tom figured, more than enough for cooling purposes for the engine with no appreciable loss of flight power.

He was elated that the smallest version of the new prop appeared to have more than sufficient thrust for the new plane. He asked Hank for two other things.

“Go ahead and make the next size up and we’ll test both of them on an existing *Special*. Oh, and here’s the trickier one. Is there a way you can see to make a twelve foot diameter one that can be used as a pusher prop and folded back into almost a

cone when it isn’t in use?”

Hank stared at his young boss. He scratched his left temple and squinted at Tom. “Why?”

Tom told him about the fold-down recon plane project.

“So, if I understand this, you would like to make a version of this new FanProp that has a hub capable of letting the blades trail back and into a tight bundle when not in use. Then, when the RATO packs fling it into the air is the set of blades suppose to open up and start spinning at high speed all in a few seconds?”

Now Tom stared at Hank. “That thought had not hit me until just now. And, I can see that isn’t practical at all, is it?” Hank shook his head. “And, the project managers won’t back off from the small ship deployment idea. Hmmm? Okay, I may need to rethink the single prop idea and turn my plane into a twin engine. Can you get this blade into a test chamber and give me all of the thrust numbers?”

“Sure, skipper. Later today.”

Tom went down below ground to the small lab and office he kept in the *Sky Queen’s* hangar. He picked up a preliminary sketch he had made for the aircraft and crumpled it up. It had been a swept-wing plane with twin tail booms and a single very large FanProp in between. It would be so large compared to the small airframe size dictated by the weight limit, that the plane featured very long landing gear that would be needed to give the proper ground clearance.

An hour later Hank called. “Skipper? I’ve figured out a way to build that giant FanProp and to reduce its size for storage and takeoff. How does this grab you? The prop blades extend and contract. Like a telescoping antenna only really strong. We make them out of carbon fiber with the outer half just slightly smaller than the inner half. The hub would have a motor and

gearing attached the screw jacks in each blade that could quickly and evenly extend the blades out in about five seconds, and even when the whole prop is rotating.”

Tom’s interest level increased. “So, this new extending prop starts out just six feet across, or so, which means it only extends out from the hub by just under three feet.”

“Right! That ought to be plenty of clearance. Didn’t you tell me that the mounting point for the hub would be at least four feet off the ground?”

“I did. And you’re certain that the strength won’t be compromised?”

Hank hesitated a second before answering, “The only thing we need to compromise is how much we can angle the blades. In fact, it would be great if we could not have to change the angle at all, but if we have to then either the hub has to grow to more than twice the current size, or we need to restrict angle change to about a third of what we now have.”

“For testing purposes, build me one that doesn’t need to change angles at all, Hank. The spec never called for that anyway.”

Tom went back to his design. He had previously scanned in the crumpled design page so he called that up on his computer. The twin booms still made sense so he decided to look at other portions of the plane. At just twenty-two feet long with a wingspan of twenty feet, it looked a bit like a modernized P-49 fighter plane without the engine nacelles. He clicked and dragged the two tail booms out enough to give adequate clearance for the large FanProp. That set off an ‘unbalanced stability’ alarm in the CAD program he was using. Now, his wingspan was too short. He extended each wing by a foot, then another and finally had to settle for an additional four feet on each wing.

Of course, that set off another alarm telling him that the tail booms were no longer adequately long. Pulling those back by an additional three feet fixed that issue but the vertical stabilizers now needed to be extended by eleven inches, and the horizontal stabilizer that ran from boom to boom was in need of being thinned a little and extended back three inches.

Finally, the computer was happy. Tom was not.

Even using almost all composite materials, this new aircraft frame came in at thirteen hundred pounds. That left just two hundred for the engine, the instrumentation seats, tanks, computers and the new FanProp.

With a sigh he saved his work for some future project and set to creating a new design.

The lightest and relatively stable plane he could think of was a balsa wood flyer that any kid could still buy for under a dollar. The narrow and long body combined with a light yet strong and flexible over-wing with a fifteen-degree upward cant from the fuselage gave great stability.

He muttered, “Why not?” and started to input the basic structural components. In less than half an hour he had a complete aircraft, now thirty-seven feet long with a thirty-six foot wingspan in the CAD program. The autocheck feature declared it to be a viable design. Tom was about to begin tinkering with the design to turning into something a pilot could sit in when his phone beeped.

“Hello, Tom. Senator Quintana is on your line six,” announced Trent and then he hung up.

“Senator,” to greeted his caller. “If you are calling to see how far along I am I have to tell you I am still stymied a little by all of the constraints.”

“Oh. No, Tom, actually I am calling to tell you that the French

company has requested to be able to bring over a demonstration plane. I believe it is a one-quarter size remote controlled plane. And... well, even with me putting little pressure on them, the project manager and his team have agreed to a demo in three weeks. Is there *any* way you can compete with that?" He was almost pleading.

"Senator. I'm not sure what's going on but if Dad finds out about this he'll blow his top and tell me to junk this whole thing. Getting stuck with a million dollars in parts on that Navy drone project left a pretty bad taste in his mouth. He'll smell something nasty here and have us cut and run!"

"Yeah. I understand. So, even if you can't do the flying model, can you still submit a design and bid?"

Tom hesitated. "I'm actually tempted to say 'no,' sir. This project is ill-conceived and poorly managed, and I'm getting the feeling that the French company may have an inside on this anyway. Why are they being allowed to steer the process?"

"I've got to make a call, Tom. Promise me that you'll keep at this for another day or so until I can get back?"

Tom agreed. After hanging up he went back to his design.

The first problem came in trying to put a cockpit into the design. The balance was pretty narrow, so anything not exactly on the center of balance point made the airplane unstable. Too far forward and it would nose straight into the ground. Too far back—even to the balance point—and it would be impossible for a pilot to see where they were going around the long front end.

He decided to complete the design as an exercise. The cockpit was in place and landing gear added to the nose and as far back on the fuselage as possible to provide some counterweight. A front-mounted engine would not be viable so Tom placed it at the back of the wing and then adjusted the

fuselage to dip low enough so the prop didn't cut it in half. Checking the likely weights, he was happy to see that this new design came in at one thousand two hundred pounds. The engine he imagined using—a Y-2 version with the block and heads made from cast magnetanium alloy—would weigh just eighty pounds. Instrumentation was known to be one hundred twelve pounds and the two seats Tom would build would be from light carbon fiber at about twelve pounds each.

Two carbon fiber fuel tanks and his FanProp would take the final weight to one pound under the allowed limit.

By the time Senator Quintana called back late the following day Tom had already begun working with Hank Sterling and also Arv Hanson, his chief model maker. Any time a scale model—static or functional—needed to be created, Arv was the go to man.

"Yes, Senator. Did you find out anything useful to me?" Tom was being rather blunt but hoped the Senator did not take it personally.

"Indeed I did, Tom. For starters, ACS was provided a prelook at the specs five months ago. That is illegal as all get out and the individual responsible for allowing that has been visited by Federal Marshals and led off to answer some pretty tough questions. ACS had been notified that they are in violation of the law and that they will not be allowed to bid on the project. They have indicated that they are going to file an appeal through the European Trade Commission in Brussels and are insisting that they did not ask for the 'look,' but rather a disgruntled American must have sent it to them."

"Is that likely, sir?"

"Hardly!" the man snorted derisively. "The person currently incarcerated here is the cousin of one of the ACS executives. The only bad thing is that we have to have at least two

competing bids or demonstration aircraft before we can award this to anyone. I'm in a quandary about this."

Tom told him about the balsa-inspired design.

"Tom. If you can build the scale model and demo that to us in nineteen days, and if we give this French company permission to do their demo, then we ought to be able to eliminate them and let you built that plane!"

"That's fine, sir, but you do realize that the plane will likely be flawed and not fully usable because the entire spec is flawed? I'm not actually certain dad would let us built the thing even if we win the bid. Sure, we could make some money off it, but at what cost? Reputation? One or more pilots' lives? That's unacceptable all the way around, sir."

In the end Tom agreed to built the test model and to demonstrate it to the project team.

He went to visit Arv.

"So, as long as you and Hank and whoever else I need to get assigned to this can build a flyable model about nine feet long with a scaled down static version of the FanProp Hank is building me, I can get Dianne Duquesne and her folks to build a tiny Y-2 engine out of model plane engines. So, look me in the eyes and tell me if this is doable or not."

Arv looked Tom straight in the eyes. "I *is* doable and all in the next day, skipper." Seeing Tom's shocked look, he said, "I'm assuming that this doesn't need to be scale weight, so I have wire framed all of the fuselage and wing and control surface parts already and started turning them out in my largest 3D printer yesterday! I'll have the last of them finished tomorrow morning and then all I have to do is assemble them!"

Giving the man a grin, Tom asked, "What if I came over to tell you the project is off?"

"Then, I'd be building myself a really nice model airplane. Minus Dianne's little wonder engine, of course."

On a whim, Tom asked, "Can you make me a second scaled cockpit? In two pieces but approximately scaled to weight. Add some heavy duty sticky tape to the halves so I can attach it to something."

Arv was curious but decided not to ask questions.

When he and Hank entered Tom's underground office the next afternoon, they were both smiles.

"CanI assume that things are looking pretty good?" he inquired.

Both men nodded.

Hank spoke first, "We added the mini version of the FanProp attached to a high-torque and high-speed electric motor for testing. Want to come out and fly it with us?"

Tom jumped from his chair and the three raced across the hangar floor and up the long stairway like little boys. Arriving at the top and slightly out of breath, the proceeded to the Barn in a more orderly manner arriving there three minutes later.

Sitting on a workbench was the model. Although Tom had designed it he was still amazed at its appearance. It really did look a lot like an old balsa wood plane, but one with a somewhat bulbous cockpit forward of the front of the main wing and the rear-facing engine/motor pod.

He unplugged the plane from the power supply that had been charging the onboard battery pack and they carried it outside.

Tom tapped the TeleVoc disc on his shirt collar and began mouthing words. Though he made no sounds, the other men didn't question this as both knew how the TeleVoc worked.

A minute later Tom smiled and tapped the disc again. “We’ve got clearance for this side of the main building cluster,” he told them.

Mere minutes later it was soaring up from the tarmac and into the air. It took Tom a minute to get used to the way it controlled but he soon had it turning, dipping, climbing and even managed to get it to do a sloppy barrel roll.

Landing it, he turned the controller over to Arv. Hanson took the model up and flew it in ever-tightening circles overhead. “If this thing is supposed to be a recon plane. they might need to do this,” he told Tom and Hank.

When Hank’s turn came he chose to try flying the plane as slow as it could handle. As he was flying it, Arv pulled out his cell phone and set it on the ground, then paced off about fifty yards and dropped his car keys.

He shouted back, “Hank? See if you can fly the thing low and slow over my phone and then straight here. And, Tom? Yell out when it passes the phone.”

Two minutes later, having completed the slowest pass he could manage without losing altitude, hank set the plane back down and taxied to back to Tom. By that time Arv had rejoined them, reclaiming his wallet and phone on the way,

“Thirty-one seconds,” he told them taking out a calculator. “That means... at scale speed... hmmm... yes. That comes out to about sixty-two knots stall speed and your slow speed pass at sixty-five.”

Tom suggested an entire range of tests both in and out of a wind tunnel using more precise laser measurements and timers. “We need to tell the project team what the stall, slow and top speeds will be,” he told them. With the weekend starting the following day, Tom suggested, “Don’t get going until Monday. And, thanks!”

He walked to the Administration building and upstairs to the shared office.

“I hear you did a little test flight, Son. How did it go?” his father asked.

Tom enthusiastically told him about the stable flight, the flyability even in a barrel roll, and also about the slow speed pass.

“That’s great, Son. Now I have some news. While you were outside flying the model, the Senator called for you. Trent passed the call to me. Quintana is thrilled that you were flying you model. The bad news he had is this; the project manager still wants to consider the entry from that French aviation company. And, the demonstration has been moved up *to next weekend!*”

CHAPTER 3 /

WHAT IT OUGHT TO BE IS THIS...

IN THE next couple hours Tom had to notify Arv and Hank that they would need to at least work on Saturday. They both understood the reason so neither one seemed too bothered. Also, Tom sat down and triple checked all of his design work, printed out the final design, and began to fill out the last half of the bid response.

He toyed with the idea of adding an addendum outlining what was wrong with the original specification, but opted to simply add a line item stating that Swift Enterprises, given fourteen days notice, would be pleased to present a second design that would be functionally superior to the one constrained by the specs.

He read the statement through several times before changing it to read:

24—B: Swift Enterprises believes that an even more capable aircraft can be created at close to this price point that meets or surpasses all operational specifications but exceeds several limits we feel might unnecessarily restrict the capabilities of this project's aircraft. We can be counted on to provide such design plans if given fourteen days written notification.

He nodded with satisfaction.

By Monday Hank and Arv were visiting him in his large lab in the Administration building. They news they brought was mostly good.

“Skipper. We have run the full range of test that can be performed up to the point where we get the finished power plant from Duquesne and her team. And, for the most part

things are looking good. The airframe can handle flight stresses with only slight modifications necessary in the finished product. Also, we verified that it does, indeed, have a stall speed of just over sixty knots. Sixty three point two to be exact. And, things look like they will hold together even up to four hundred knots if that is ever possible.”

Tom sensed there was something unspoken, so he asked about it.

Hank looked at Arv before answering. “it’s going to be a miserable ride for the pilot if he hits anything like moderately choppy air, Tom. She’s just too light to handle rough weather. Even going up through a simulated pre-storm cloud the accelerometers inside measured two to three G shaking forces in the seat. And, that’s both up and down as well as side to side.”

“Oh. Well, we might design some sort of dampening mount, but that’s going to add weight. unless,” Tom said brightening, “we can do it with elastic bands.”

“You mean mount the seat on a series of bungee cords?” Arv asked.

“If that’s what it takes, then yes. I am.”

The three men stood in silence as each thought over what such a system might entail. Finally, Arv spoke for the three of them. “Kluge job if there ever was one.”

The other two agreed.

Well, then, we present what we have and what we believe and hope the French company hasn’t thought of any of this!” Tom concluded.

The next day an official notification was hand delivered to Tom by a U.S. Senate courier. It was the invitation to

take part in a demonstration fly-off between Swift Enterprises and Aero Conception Spécialité to take place the following Saturday in Washington D.C. The exact location was the former Bolling Air Base, now an auxiliary base across the Potomac from Reagan National Airport. As per the letter and map, a large area of concrete and tarmac, once the main terminal building, would provide ample room for the flight demonstrations.

The only constraints on their flight plans were that they could not cross out over the water, thus taking them closer to the airport, nor could they exceed five hundred feet in altitude, which would take them into controlled airspace.

Tom and Arv poured over the map and worked out what they believed to be the best flight path to provide the review team with the best examples of how their model would fly. They would take full advantage of the 800 meter by thirteen hundred meter open area for their twenty-minute flight.

Tom suggested that he could create a computer program that would run on his tabled computer that could be wirelessly in communication with the R/C control station. Every move from the first taxi and rev up of the little engine through to the final waggle of the model's wings before it landed could be meticulously orchestrated.

And, it would have been a marvelous plan except for one thing. Dianne Duquesne and the two of her engineers assigned to the little Y-2 engine project had hit a snag. A very nasty one at that. In spite of everything they tried, once the little engine had been assembled it ran so rough that it threatened to shake itself apart at anything over quarter throttle.

Almost in a state of despair, she called Tom. "I can't understand it," she explained after telling him about the

problem. "We've made larger Y-2 engines that run great. All I can think of is that it's the size of everything. Maybe we've gone too small. I don't honestly know what to do."

"I'm on my way over," he told her and soon walked out of the office and the Administration building then jogging to the Propulsion Engineering building four hundred yards away.

When he walked into the large lab room, Dianne and her two engineers, Larry and Caryn, were standing looking despondent.

"Is it safe to run it a little so I can see what's happening?" he asked them.

"For a couple minutes at least, Caryn replied. At a nod from Dianne, she moved over to the bench where the small engine was mounted. The central crankcase had been made from carbon fiber but all six of the cylinder heads stuck out from that allowing their build-in intake and exhaust ports to be exposed. The exhaust ports actually fed into a combination muffler and extraction system so the room would not fill with fumes.

She slipped her index finger through a small loop at one end and gave it a little pull to get some fuel into the cylinders. Then, she attached three double heat plug connectors to the pairs of cylinders. As she was completing this, Tom leaned over and whispered something into Dianne's ear.

Her eyes went wide and she turned beet red.

"It's ready, Tom," the engineer said.

"Heat those plugs and get her running," he told her.

Two pulls later the engine started up and was soon idling, although a little roughly. Caryn pulled off the plug

connectors and gave the throttle a little twist. The engine revved up but the fast it went the more vibration they could all see in producing. A minute later she turned it off.

She and Larry looked at Tom. He looked at Dianne, and then at the engineers before turning around and walking out of the room.

Larry and Caryn were stunned. They both immediately thought that their jobs were about to be terminated. Dianne motioned them to sit with her on the edge of a desk. "We wait until he comes back. Stop fidgeting and worrying."

Tom was back eight minutes later with something fairly flat wrapped in tissue paper. He pulled the paper off and handed it to Larry. "Put that on and let's see what happens," he directed.

It was the scale model of the FanProp that would be attached to the engine.

After tightening the two set screws and checking to see that the prop rotated freely and had no wobble, Tom gave the order to start the engine once again.

This time, and to the amazement of both Caryn and Larry, but to the evident embarrassment of Dianne Duquesne, the engine purred and ran like a champ. When they shut it off, Larry turned to Tom.

"What the heck happened there?" he asked.

Tom turned to Dianne. "You want this one?"

"Guys? What did we need to do differently when we dropped the Y-4 down to a Y-3 configuration and even more so for the test Y-2?"

Caryn looked thoughtful and then brightened.

"Flywheel!"

She referred to the fact that there were enough cylinders in the Y-4 engine that the normal flywheel in an engine could be done away with; there was enough constant torque and power that the engine didn't need one to run smoothly at any speed.

When Tom had asked them to develop a Y-3 engine it had been necessary to install a small and moderately lightweight flywheel. This was an absolute necessity when they scaled down once more to the Y-2 configuration. In fact, although Tom had designed a new flywheel that was thin and lightweight near the center, it was heavy for the engine size at the outer rim.

"So, children," Dianne concluded, "we knew that the propeller was going to act like a flywheel for us, so we never made a temporary one for testing." She slapped herself on the forehead. "Kevo kravio!" she said, "as my Greek grandmother used to say. Empty skull, indeed!"

Before leaving them, Tom asked that they run thrust and other tests so that he could determine if the little engine was going to do the trick. The fallback would be to have them rebuild it but as a Y-3 engine. It would require a new engine mount and pod from Arv, but if that is what it took, that is what would have to happen.

The following day Dianne reported to Tom that the thrust was going to be sufficient to power the aircraft, "...just as long as they don't want this thing climbing at more than a thousand feet per second."

Tom looked through the specs and saw that nowhere did it mention climb rate. He made a note of this and turned back to his computer where he had been playing around with an older project. He had two purposes in mind but the

primary one was to take his mind off of the upcoming aircraft demo. He was interrupted by a call from Hank.

“Skipper? I was wondering if you had made headway in that flight program you were going to work out for the demo.”

Tom blanched. “Blast! I completely forgot that, Hank. I’ve been so busy trying to finish the bid proposal and work with Dianne, I just clean forgot. Looks like I’ll have to do it manually. As soon as Dianne turns the complete engine over to you and Arv, get it mounted and we’ll take it out for some practice runs. Okay?”

“Boy, you have been off doing other things, skipper. We finished everything an hour ago and even took it out for a short taxi and one-foot lift off. Head on over to the Barn and we’ll run through everything.”

When he arrived, Tom stopped in his tracks. The aircraft standing near the large open side of the hangar was a sight to behold. And, it had changed.

“What gives?” he asked, pointing at the tail boom.

“Oh, that,” Hank replied. “Well, once we got the engine mounted and it started shoving all that air backward we found out that the single tail boom moved around too much. That dip it takes to get under the FanProp weakened the structure a little. So, we added a port and starboard brace that swoop out and around the prop just like the lower part of the boom. Makes a nice safety bar as well.”

Indeed it did. Extending out from the side of the fuselage on each side, an additional strut swept out and around the FanProp and then attached to the tail boom.

But, you just go the engine from Dianne an hour ago. You can’t have done all that in between then and now.”

Arv looked a little sheepish. “Actually, Tom, Hank and I talked about that last week. Neither of us was satisfied with having to curve the boom, so we sort of built those braces and added them to the model over the last weekend. You mad?”

Tom laughed. “As long as it works and we can find a way to work those into the weight limits on production planes, heck no! I’m a happy little inventor. Let’s see her fly!”

Tom took the remote control that Hank offered. In return he handed Hank his tablet computer. “Keep an eye on the GPS tracker dot and call out each of my net moves. If you can, give me at least three seconds before you tell me to ‘execute’ each one. Oh, and I’ve got a test overlay showing the boundaries at Bolling. Just hit that letter B in the upper corner.”

Minutes later the little plane lifted off and headed upward. As it leveled out, Hank began giving Tom maneuver after maneuver. There were a few mistakes made but nothing they couldn’t practice over the following couple of days.

Overall, the plane performed well. The wide wingspan made it a little awkward in sharper turns and Tom found that he absolutely could not take his fingers off the controls; the plane always wanted to go nose up and lift its left wing.

“Torque lift,” he told his companions. “But that’s always going to be an issue with a single prop. If we had the luxury of even another hundred pounds I’d say we add gearing and a counter-rotating second prop, even if it is just a weighted thin-spoked wheel. As long as it counters the torque it would be a handling improvement. I’ll keep that in mind.”

At Arv's suggestion they ran through the entire set of maneuvers once again. This time, there were no mistakes and Arv, who had been keeping a close eye on the plane, told them that it had looked great.

Due to lack of early access to Bolling Airbase, the Swift team—consisting of Tom, Hank and Arv as the operations team, Bud and Mr. Swift as logistics and Sandy and Bashalli as their cheering section—officially listed as 'support team members'—arrived at the base in a truck they had carried down in the hangar of the Sky Queen. Hank, Arv and Bud had arranged themselves around the plane while the girls and Mr. Swift joined Tom in the cab.

Once they had cleared security at the main gate and been provided with passes and an escort, they drove down a wide and remarkably unoccupied street until their guide pointed to the left.



"That's it, folks. Take this left and then we'll follow the road to the right and through the security checkpoint. Beyond that is the parking lot and the area you will be using."

Three minutes later the men were taking the plane down off the back of the truck and getting it turned so that it could taxi to the starting point.

"Hey. That's a whole lot better looking than those folks from Europe brought in an hour ago. Fact is, theirs looks like it was kinda knocked together at the last minute. This one looks real sharp. I'm pulling for you, whatever this contest is about!"

As they moved the little plane around to the front of what had once been a fairly large hangar, they first saw the French entry and then the bleachers set up in the shade for the project selection group. Currently they were crowded around the ACS plane.

"Our escort wasn't far off, Son," Damon said leaning over to speak in Tom's ear.

The plane, about twice the size of the Swift entry, seemed to have begun life as a combination of an ultralight plane and numerous sheets of thin plywood. Where the original plane would have featured a fabric-covered wing, the thin wood now covered everything. The real difference, Tom noted, was that a solid cockpit—to his eye looking like formed polycarbonate—was perched up front and a tubular tail boom at least half the total length had been added to the back.

A man came over and shook hands with Damon and Tom. "Hi. I'm Carl Capstock, project manager for this, well, project. Uh, I guess you can see that the ACS folks are here. Uh, I understand that you kinda feel this may not be a very

good project. I'd hate to discount you for that, but I have to ask why you feel that way." He looked expectantly at them. Just as Tom was about to speak they all heard a car pull up behind them.

"Damon, Tom!" came the booming voice of Senator Quintana. "Wait a second." He came striding over quickly. "Who are you?" he asked Carl in a tone of voice that spoke of his intense displeasure in having to deal with the man.

Slightly flustered but obviously not knowing who he was addressing, Carl said, "I'm the project manager. Who gave you permission to be here?"

"PM, huh? That's nice. Glad to have you here. I'm Senator Peter Quintana from New Mexico." He was speaking in a friendly and fairly quiet voice while his gaze could probably melt steel. "I am here to do three things. One, protect the integrity of this test. And, as this entire project has been tainted with mismanagement and leaked documents, that is my number one job. Two, I am here to ensure that you and your team don't do anything foolish like try to claim one thing when something different happens. And three—and you're really gonna hate this one—I am here to have you arrested by those U.S. Marshals at the end of the demo." He pointed to a trio of rather large, plain clothed men in matching dark glasses. "Now, you are not going to say anything to anyone about that, or you will be immediately arrested and charged with special contempt of Congress. You are to handle the demonstration in a fair and orderly manner and will answer each and every question put to you. Have I made myself clear?"

Carl Capstock looked like he wanted to either faint or run. He did neither, instead he nodded and made an audible swallow noise. "Yes, sir," he managed to get out of

a very dry mouth.

The ACS Team from France was allowed to go first. They had problems from the start, but concluded their flying demonstration within the thirty minutes allotted.

The head of their team, in broken English, tried to explain that the laminated covering for their wings had come loose during their flight and that they had inadequate time to repair it.

He sat down and Carl stood up looking slightly shaken and disappointed.

"Well, thank you and I must say that we completely understand. So, if there are no immediate questions we shall let the—"

"I have a question," Tom spoke up. He stood. "Actually I have three. First, has ACS done altitude testing. Even in a partial vacuum chamber to test lifting viability at the altitude this plane is suppose to fly. Second," he forged ahead not letting anyone answer, "are these the materials ACD plans to use for production planes, and third, how do they plan to pressurize the cockpit? Oh, and will two men be able to get into that cockpit even when it is scaled up to full size?"

The ACS team suddenly lost their ability to understand or speak English, to a man. No answers were forthcoming, so Tom said, "Then I guess we're up. Come on gang!"

The Swift team stepped out of the bleachers and performed the final systems checks on both the plane as well as the remote control.

Three minutes later the engine was started and the plane was left to idle for a moment while Tom and Hank got the computer ready. At the six minute mark the plane moved

forward and after a short run across the concrete it lifted off.

Maneuver after maneuver went smoothly and as planned. Tom skillfully piloted the model all around the open area in front of the hangar showing off everything from high-speed runs and climbs to semi-acrobatic moves. With Hank's assistance he stayed right on schedule, and twenty minutes later Tom brought the plane in for a low and slow pass directly in front of the stands.

As it passed in front of them, even the French designers had to grudgingly admit it was a beautiful sight.

CHAPTER 4 /

DAMN THE BUREAUCRATS, DO IT THE RIGHT WAY!

DAMON SWIFT took a look at the test results. They weren't encouraging, and he told his son exactly that. "The airframe is incredible, but the results from the combination of that power plant and the new FanProp only works at lower altitudes." He smiled at Tom. "But, you already knew that, didn't you?"

Tom nodded. "Right from the start, Dad."

It had been two months since the demonstration in Washington D.C. and the awarding, shortly afterward, of the project to Swift Enterprises. In that time, a construction team headed by Hank Sterling had built the first full-scale test plane. Weight savings had been realized once Tom suggested using ultra-thin cables pre-tightened between key point in the frame, wings and tail booms to add strength while allowing one or more layers of carbon fiber cloth to be used in certain areas.

In all it had saved only about seventy pounds, but that had been enough to cover several additions to the plane such as an in-cabin oxygen concentrator to provide that vital gas to the occupants instead of needing bottled O₂ or a large and heavy piece of equipment attached to the engine.

Scaled up it remained looking like a balsa model that had been enhanced.

Bud had been selected to perform the test flights and had been enthusiastic about the opportunity. This first flight had been low and slow and mostly kept within the confines of the grounds of Enterprises. By the end of the first week—including five flights—he was feeling a little disappointed with the plane's abilities.

He and Tom met before Tom was to take the preliminary

results to his father. “It takes off great. In fact, it’s a little difficult to keep it on the ground once you get it up to about fifty-five. I was rotating at seventy and managed to get it up to one-sixty-seven at sixty percent throttle.”

Tom looked curious. “Do you think it will get up to the magic speed they want?”

“Three-fifty? Sure. In level flight and maybe it will maintaining that in a climb, but it feels, well, like something is holding everything back. I know that sounds strange, but it’s almost as if you give it some throttle and a hand sorta holds onto the tail so you don’t get as much out of it as it should be giving. Am I making sense?” he asked, giving Tom a puzzled look.

Tom nodded. Wind tunnel tests on the model had shown that the high and fairly deep wing were providing plenty of lift, but their drag coefficient was at a whopping 1.1 when it should have been closer to 0.4 or 0.5.

About the only art of the plane that performed as required were the twin tail booms. The original side-by-side cockpit had to be replaced by a one-behind-one arrangement so the fuselage could be narrowed.

Tom headed over to show his father the initial reports.

“So, now that you have some proof that the concept isn’t going to give them what they hope for, do you have a backup plan?”

“Tom nodded at his father. “The problem is, it is actually going to give them just what they are asking for. At least, I hope it will. I’ll know tomorrow when Bud takes it up for an altitude run. he’ll only go to forty-five thousand, but that ought to give us an idea if it can make another twenty K. If it can, then I haven’t been able to find any way to improve the performance short of a complete wing redesign.”

Damon nodded slowly. “I see. And, if you did redesign the

wing?”

Tom shrugged. “We can get the drag down to around .67, but our big culprit is the thing that makes this flyable at the speeds they insist on. The FanProp gives us all the thrust we need, but it also acts like a giant air brake. I’ve tried all the variations in the computer. More blades, Fewer blades. Thinner and thicker, straight angle as opposed to the graduating angle of the current one.”

“What about a smaller FanProp? And, maybe a larger engine to spin it faster?”

“I thought of trying that, but the computer says ‘no.’ Well, that’s not the whole truth. The simulation software says that if we had a pair of four-foot-nine props with three-foot spacing between the tips we would present a much lower drag surface and have as much thrust as right now with this setup.”

“I’m sensing a problem from the way you’re talking about it,” his father stated.

“Yes. To do it right, and by that I mean with the appropriate amount of power, we’d need two engines of the current size, or a larger Y-4 or Y-6 engine with all the gearing necessary to drive two different propellers. Either way, we miss the weight limit by more than five hundred pounds!”

Mr. Swift asked Tom what he wanted to do.

Tom asked for a couple hours to think it over and left the office. He headed for Hank Sterling’s workshop three buildings away.

“I need some advice, Hank,” Tom said as he plopped down on one of the stools next to the bench where Hank was currently working.

“Shoot, skipper. I’ll assume it’s about the BBF.”

“BBF,” Tom asked curiously.

“Bud’s nickname. Big Balsa Flyer. So, is it?”

“Yes. All of Bud’s flight tests plus the wind tunnel stuff you and Arv did show that the plane just has too much drag.” he told the engineer/pattern maker about the wing and FanProp issues.

“Sure. I figured the wing thing, but don’t you have to have it that deep to provide enough lift to fly slow and remain on station up there?” He pointed to the ceiling.

Giving a rueful chuckle, Tom said, “We do. The only other thing would be to give this whole thing a facelift and turn it into a powered glider—” He stopped as something hit him.

Hank had seen Tom like this dozens of times—most Enterprises employees who worked with the young man had—so he didn’t say anything, giving the inventor time to think. When Tom came out of his reverie he turned to Hank and asked, “Can I use your phone?”

“I don’t know who you think pays the bills around here, but go right ahead, owner of the company.” Hank laughed and pointed to the nearest phone.

Tom pulled out his tablet computer, called up his address book and then dialed a number. As it was connecting, he hit the Speakerphone button.

“Hello. This is the office of New Mexico Senator The honorable Peter Quintana. How may I direct your inquiry?”

“This is Tom Swift of Swift Enterprises. Is the Senator available?”

“Oh. Hi, Tom, It’s Lisa Quintana. Sure, dad’s available. Let me put you through.”

As they were treated to the music on hold, Hank commented, “Nice to know the Senator’s daughter. Does Bashalli know?”

Tom blushed. “Knock it off. Lisa is ten years older than me and she’s married with two kids—”

“Tom. Pete Quintana. What’s happening with our ugly little

plane? I assume that is what you’re calling about.”

Tom admitted that it was and proceeded to tell him about the drag and weight issues. He concluded with:

“Barring any unforeseen issues I am moderately confident that we can deliver the plane they have specified, but it probably isn’t the one they want or that the ultimate customer needs. If times and finances were different I’d go ahead and build the one we have now and then build another that is what can actually be used. But...” He left he rest unspoken.

“Yeah. I can see that, Tom. Well, it seems like every time we talk I end up telling you I need to make a couple calls and will get back to you... looks like I’m not going to break that streak. Will tonight at home do?”

Tom told him it would be fine.

“Hank? Take a look at something for me.” Tom tapped the screen of his computer and called up the design file he had made almost three months earlier. It was his “futuristic P-49” design. Its ample yet aerodynamic fuselage sported a thin and wide overwing configuration making it appear more glider than powered aircraft. Twin tail booms featured individual vertical and horizontal stabilizers with no attachment between them.

“Is that an air intake?” Hank asked pointing toward the rear of the main body.

“Yes. And there is a matching one on the underside. Each one feeds a separate compact dual-bypass engine; they sit side-by-side.”

“Dual-bypass?”

“Yes. Like most efficient lower altitude engines it has a high-bypass capability providing great thrust as well fuel savings. But, at higher altitudes, all that air going outside of the combustion chambers is lost oxygen. So, and Dianne is going to have a field day making this happen, at a specific altitude—

probably around fifty thousand—the high-bypass channels close down and become low-bypass with all the extra air being shoved into the combustion part of the engine.”

Hank looked at the plane design again. Then, he looked at Tom. “What kind of thrust will those engines provide?” he asked.

“About thirteen hundred pounds. Each. All my computer simulations sat that the pair could give this jet a two thousand foot per minute climb rate, let it fly at between three-fifty and three-eighty top speed and the wings could support flying at the high altitude of around one hundred knots.”

Hank whistled. “That’s pretty good. Uh, sore spot, I know, but what’s this going to weigh?”

“Empty weight—no fuel, no pilot and no reconnaissance camera package—about thirty-two hundred pounds. It should fly easily at a loaded weight of six thousand.” He looked at his friend and employee. “Can you do a fast breakdown and tell me what this is going to cost to build? Exclusive of the engines, that is.”

“Give me a day to study the design, inside and out, and I’ll get back to you,” he offered.

That evening Tom received the call from Senator Quintana. “Hello, Tom. I’ve had an exhausting day of call making. And, when I say ‘I,’ I mean my poor daughter. She sends her hello, by the way. Anyway, about fifteen calls later I have somewhat of an answer for you, even if it may not be to your actual question.”

Tom gave him a weak laugh. “Anything that comes down on the positive side of the line could help, sir. What were you able to find out?”

There was the sound of rustling papers from the other end of the line before the Senator replied, “Right. Oh, before I start did I tell you or your dad about the former project manager?

Probably not. Anyway, he saw the writing on the wall and copped a plea bargain. Sang out loud and clear about that ACS company paying all sorts of bribes and how he had ended up promising them that Swift Enterprises would not be able to make a demo, so whatever they brought, as long as it could take off, would net them the contract.”

“How could he do that to our Government?” Tom asked.

“His wife is French. Her father is a minor ministerial functionary in their government and he claims they both put pressure on him.” He sighed heavily. “His wife has left to go back to France and he is facing twenty years in prison. Such a waste!”

“Yes,” Tom agreed. “So, is that the *good* news?”

“Oh, god, no. Not by a long shot. We found out that the project team had set aside a large sum of money for the contract winner to build their test prototype. And, and get this, he left a paperwork train detailing that if the French company won, they would get the whole bundle, but if an American company won, the French would get half—I suppose for their efforts—while the winner only received the other half.”

Tom was stunned. “Uh, can I get you to hold so dad can hear this?”

“Sure.”

Tom put the phone down and went to the living room to get his father. The Senator restated what he had told Tom.

“That’s absolutely unconscionable! How could he ever figure to get away with that?” Damon demanded.

“Calm down, Damon and listed between the lines. With the entire prototype package now available to be paid to Swift Enterprises, you can finish the prototype that barely meets the specifications, and then Tom can hopefully build a second aircraft that is what he wanted to do in the first place. The hell

with what those petty bureaucrats want, do it your way!”

Damon looked at Tom. “Can you do that?” he asked almost under his breath.

“I’ll let you know tomorrow when I have the build figures for the second aircraft!”

* * * *

Five weeks later Tom, Dianne Duquesne, Hank Sterling, Arv Hanson and Damon Swift received calls from Jake Aturian, Damon’s friend and manager of the Swift Construction Company. Each call was brief and requested their presence at the Construction Company airfield that evening at nine p.m.

When they arrived it was to see a set of chairs placed on the taxiway facing the runway. It was a crescent moon that night and a bit of cloud cover hid most of the stars, so they were barely able to see the runway fifty yards farther out.

After thanking them for coming, Jake got down to business.

“As you know, Tom and Damon accepted a challenge from the Government to design and build a high-flying reconnaissance aircraft. As your eyes get accustomed to the darkness you may be able to see something over on the runway that is covered by a large tarp. Yes, that would be the finished prototype.”

The group murmured a little before he continued. “Now, as this is a secret project, it is impossible to have the aircraft out in the open during the day.” He was interrupted when a figure in a pressure suit walked past the group and headed toward the tarp.

“That is our own Bud Barclay who will be performing the first test flight. I wish it could be during daylight out in some desert where privacy might be assured, but we don’t have that option. If you will follow me, we’ll uncover it!”

The group eagerly walked across the grassy area between

paved strips and up to the tarp. Bud had already ducked under and was nowhere to be seen.

“If I can get Hank and Arvid’s assistance, we’ll get this uncovered and Bud can run the engines up.”

A minute later the group stood in front of what had to be the most unique-looking glider. The whole effect was ruined when Bud gave them a thumbs up sign out a small window in the cockpit and then started the engines. The group stepped away and watched as Bud taxied the jet down to the end of the runway and then turned around. At a flashlight signal from Jake, it began to roll forward, the sound of its engines—unusually quiet for a jet—finally reached them a second later.

Before it even reached the halfway point in the runway it practically leapt into the night sky disappearing as it passed above them.

“Sorry that this has to be so dark that you can’t see it, but I figured you’d all like to be here as you all had so much to do with it!”

As they walked back to their cars, Damon put an arm around his son’s shoulders. “They might have not known it before, but once they see that magnificent aircraft, it’s sure to be a big hit. By the way, what are you calling it?”

“Well, I thought of the original as being the Ultralight ReconPlane so Bud twisted it a bit and is calling it a Little Orphan ReconoJet. I’m for something right in the middle.”

