



SWIFT ENTERPRISES PRESENTS

Hank Sterling and Arvid Hanson— Patterns and Models

With T. Edward Fox

Hank Sterling and Arvid Hanson work for Swift Enterprises in two separate worlds, except that practically nobody understands how significantly their work differs. Or, how it all comes together.

It even took Tom Swift several months and a couple of inventions to finally get things straight.

Hank and Arv are good-natured about it all, much the same as twins come to terms with the inevitable mixups and confusions.

This is the story of how they worked together on one of Tom's inventions, and how they finally figured out a way—a very easy way—to help people differentiate between them.

Sort of.

©copyright 2011 by the author of this book (T. Edward Fox - pseud.). The book author retains sole copyright to his or her contributions to this book.

This book is a work of fan fiction. It is not claimed to be part of any previously published adventures of the main characters. It has been self-published and is not intended to supplant any authored works attributed to the pseudonymous author or to claim the rights of any legitimate publishing entity.

This book is dedicated to people who built the things that we all either take for granted or tend to attribute to the wrong person. Thomas Edison didn't single-handedly invent or build the electric light bulb, the phonograph or even most of the whiz-bang things he is credited with. There were many people with brilliant minds behind all of the success for which he took credit.

SWIFT ENTERPRISES PRESENTS

TABLE ON CONTENT**Hank Sterling and Arvid Hanson—
Patterns and Models**

FOREWORD

Find every man—or woman—known for some fantastic invention, and you can bet that there are one or more talented people behind them. Even the greats, like Tom Swift, have a team of people at the ready to assist them by making their visions, plans, designs and even wild wishes come true.

Such it is with a pair of men at Swift Enterprises. We see them as they drop by Tom’s office or lab where they get a brief rundown of what is needed, and they just go off and do it.

They are not interchangeable. Their work is totally separate, even though the work of one generally aids the work of the other. And, they constantly work together.

One deals in a world of miniaturization where the other works full size, but with many, many pieces. One makes models and the other, the patterns from which things are made.

I sat down with the two of them over a period of a couple weeks during one recent project: the building of a new personal transport to be used by both the Army and the Marines. This is that story and how they each contributed to its success.

I’m pretty sure that I now have them straight.

Thackery E. Fox

Chapter		Page
1	The Call From Tom	3
2	They Want <i>What</i> in There?	6
3	“If He Does <i>That</i>... What is it <i>You</i> Do”	9
4	Worst Case Scenario	13
5	Speed Doesn’t Kill, But is Sure Hurts	16
6	Try, Try Again	20
7	Off For Mass Production... Whew!	23
	Epilog: The Debriefing	27

CHAPTER 1/**The Call From Tom**

IF HE COULD rely on anything, Hank Sterling knew that he could rely on his boss—one of his two bosses, actually—to come up with some real humdinger projects on which to work.

Hank's bosses were Tom Swift, young inventor and scientist, and his famous father, Damon Swift. Between the two Swift men, they had created more than three hundred major inventions and held a combined fourteen hundred and eleven patents. Shy of the record held by Thomas Edison, but then, most of Edison's patents had been the work of others for which the better-known inventor had taken credit.

Wherever possible, Swift patents listed all the major project contributors. And, anything created solely by an employee could be patented in their name just as long as Enterprises had first rights to it.

Hank was a long-time employee of Swift Enterprises and was primarily responsible for the creation of the patterns and pattern pieces that went into the physical makeup of most of the inventions and products created at both Swift Enterprises and the Swift Construction Company.

This meant, in simple terms, that Hank and his team took all of the designs provided by Tom and Damon—plus most other departments at Enterprises—broke everything down into manageable components, made 3D models of every piece and then finally made those pieces real.

Of course, there were many other steps in between, and most of the component pieces were eventually used to create molds, jigs and other shaping mechanisms so that they could be reproduced in quantity.

He had just hung up his phone following a “can you please

come see me” call from Tom. He gathered up his tablet computer, a few other items, and walked out the door and across the tarmac to the main Administration building at Enterprises.

Before heading back inside, Hank looked up at the beautiful blue sky overhead. It had been a fairly dry but cloudy spring and now that summer and his vacation time was fast approaching, Hank had been hoping the weather would behave itself. *This*, he thought to himself, *bodes well*.

As he opened the door, he saw a man he worked with on practically every Enterprises' project: Arvid Hanson. Arv was the model maker for Enterprises and created both scale mockups as well as small test models of just about everything Hank ever was assigned to.

Waving, Hank waited for Arv to reach the door. They entered together.

“The two Musketeers, back together again, hey Arv?” he said to the model maker.

“Yeah. Guess Tom's got something pretty important this time. I hear, through the almost totally unreliable grapevine, that this is a big Government project and might even be hush-hush. You know anything else?”

“Only what I hear from that same source. In other words, nada!”

They shared a chuckle as they climbed up the stairs to the floor where Tom and Damon had their office.

“Good morning, gentlemen,” they were greeted by Munford Trent, the Swift's ultra-efficient secretary and personal assistant. “Coffee's waiting on the sideboard with a maple bar for Mr. Hanson and a blueberry muffin for Mr. Sterling.”

Arv and Hank looked at each other in amusement and amazement. Munford Trent was legend for knowing just what

to stock for meeting involving most of Enterprises management and visitors from around the world.

“You’re a real gem,” Hank commented as he opened the office door.

“Only takes making a few notes,” Trent muttered under his breath. Secretly, he was pleased at having been complimented.

Looking up, Damon Swift greeted the two as they entered and headed to one side of the office. “I see Trent already told you to help yourselves. I’m leaving for Washington in a minute and I understand that Tom is coming over from his underground lab. He should be here in less than five.”

Saying that, the older inventor picked up his laptop computer, placed in inside his briefcase and left the office.

Two minutes later Tom’s voice could be heard through the partially open door. “Nuts. I was hoping to ask him something. If he calls in, can you please tell him I need thirty seconds, Trent?”

Tom entered the office. “Hey, guys. Thanks for coming.” He sat in one of the overstuffed leather chairs opposite the square coffee/conference table from the two other men.

Taking a color printout from a folder he had just set down, Tom slid it across the table.

“Take a look at this,” he said, indicating the drawing. “I’d like your opinions.”

Hank and Arv could see a sketch of what appeared to be a futuristic treaded vehicle of some sort. As with tanks and digging apparatus, it featured a continuous tread on each side. Unlike those types of machinery, the body slung in between extended from a point about ten percent forward from the rear of the treads and then stopping another ten percent of the length from the front. It also did not extend above the level of the inside, top of the treads. The body was low, sleek and

narrow.

“Strange device, skipper,” Hank commented.

Arv nodded his agreement. “What is it?”

Tom grinned at them. “That is possibly the latest thing in personal armored transportation, guys. It’s a high-speed, one-man mini vehicle, capable of traveling at up to one hundred miles per hours for at least twenty hours without refueling. It will even have an auto-pilot mode that will allow a soldier to sleep if time and situation allows. To keep it low, the soldier lays inside, reclined about seventy degrees.”

The two opposite him took a renewed look at the drawing. Now that they knew its purpose, they discerned markings for a front entry hatch along with a forward view port.

“It also can be programmed to return an injured soldier to the closest medical unit or facility automatically.” Tom took out a second and third piece of paper and slid them over. “Here’s the cross section and an internal cabin view.”

Hank whistled in amazement. “As Bud would say... Jetz! Now that I see the scale, I guess this is supposed to be about ten feet long and maybe four wide. Correct?”

Tom nodded. “Within a few inches. At least, in this configuration.”

They looked at him hoping for more information. It soon came.

“Those treads are mounted on pistons that can push them out to span more than eight feet for maximum stability—” Tom held his hands up, palms facing and moved them apart, “—plus they can be contracted in to just under four feet, leaving a six-inch gap in front for the soldier to look out of, all the while providing great forward protection and higher speeds on flat surfaces.”

They discussed how the tracks would be different from any other tracked vehicle.

“Instead of being cog-driven around the outer rims of the front and rear drive wheels and floating over the centering wheels, this track will be similar to the sort of track you find on a newer roller coaster. The track rolls over the wheels, like normal, but also features J-shaped brackets that snug out and around the wheels, cinching it down from the underside. That way, the track is held in place firmly. A Durastress chain under the brackets provides the actual drive.”

“Okay...” Hank began.

“Why?” Arv finished the thought.

“Because, this way we can independently suspend the front and rear of the tracks so that each corner of the vehicle can react to whatever is directly under it. One corner or even an entire side can be instantly raised or lowered to remain in contact with the ground. No matter how rough, it can't throw a tread.”

“I suppose it can even go long on the downhill side and short on the uphill?”

“Right, Hank. Exactly!”

“What's powering everything?”

Tom pulled a final sheet from his folder and held it up. “You remember the little Y-4 engine I came up with?”

Both men nodded. Tom had come up with the revolutionary little gasoline engine while still in junior high, but it had taken about six years for him to actually get around to building it.

Looking from the front for all the world like an inverted letter ‘Y’ with each of the three spokes being a 4-cylinder, 4-stroke engine, the piston placement and connection to the central crank shaft meant that at least one cylinder in each

spoke could be under power at any given time. This had the effect of almost tripling the horsepower over any similarly sized engine and provided an amazing amount of torque. It was so efficient that the engine did not need a flywheel to keep it running smoothly.

Small, light and incredibly fuel-efficient, the original Y-4 engine could power a four-door family sedan at one hundred fifty miles per hour, up any paved hill in the country, and still get close to one hundred miles per gallon.

“The original was just under a half liter between the twelve cylinders. This one will be just over three hundred cc's. It will still put out about a hundred horsepower and better than two hundred and thirty foot pounds of torque. More than enough to move this plus a fully outfitted soldier. Even up a forty degree incline. Plus, it gets almost one hundred fifty miles per gallon.”

Hank and Arv looked at each other and shared an almost telepathic conversation. Turning to face Tom, Hank spoke first. “How many days do we have, skipper?”

Tom smiled. He knew that both men, and their respective teams, could perform miracles when pressed. This time, however, he wanted to give them enough time to keep from burning too much ‘midnight oil.’

“I'd love to see the 3D wire model in two weeks and a 1/24 model a week later. Do-able?”

Both men were stunned. “You meant two days, right?” Arv suggested, not use to the leisure of “weeks” on any project.

“Nope. I'm still working on a few details and I don't want you to commit to a final design too fast.”

Before leaving the office they agreed that the offered schedule was more than generous and promised great things.

As they walked out of the building, Arv asked Hank, “Do you think we've missed something here?”

“No,” Hank replied with a shake of his head. “Tom always knows what to ask for based on what he can pull together. He’s never asked us for the impossible, just the incredibly difficult!”

CHAPTER 2/

They Want *What In There?*

“I’M WORKING with Hank and Arv on the mini treaded transport, Dad,” Tom told his father when they spoke on the phone that afternoon. “But, I’ve got a question, and you’ve been the one who’s met with the military brass. My figures show that we can certainly make the thing, but their weight restrictions seem counter-intuitive.”

“How so, Son?”

“Well, we all want maximum stability and high speed, but I show that running something with their specs over anything rougher than a country dirt road, and the transport will become unstable over bumps at around fifty miles per hour. It is too light!”

Mr. Swift was heard on the phone to be muttering to himself. Finally, he said, “If I remember correctly, they specified that the units needed to weigh just three hundred pounds, empty. Is that correct?”

Tom agreed that the weight was what he understood.

“What do you believe these need to weigh to be fully stable?”

Tom looked at his computer screen. “In order to provide the ground clearance of eleven inches they spec’d—which raises the center of balance and is also part of the problem—I show that a minimum loaded weight of six hundred pounds is about right. Given that their numbers tell us that the typical soldier with gear will be about two-ten to two-twenty, that means it would benefit from an increase of about a hundred pounds overall. One hundred fifty would be better.”

There was another pause before Damon asked, “What about adding an extra amount of weight at the lowest point? Maybe

even in the form of added armor or a larger water or fuel tank?”

Now it was Tom’s time to ponder. “I guess I’ve got to run a few more computations, Dad. Thanks for the insight. Could you possibly check with the DOD folks to see if we can find a happy medium, or if the three hundred is set in stone?”

“And, if it is?”

“Then I’ve got to rethink the tracks and the drive and a lot of other stuff.”

His father agreed to bring the matter up during a meeting scheduled for the following morning.

Tom had sent the entire set of drawing and design spec files to both Hank and Arv two hours earlier. He was surprised when he received a call from his pattern maker.

“Skipper? You know how I want to be a good employee and do everything you ask, right? Well, I think I spotted a mistake on your plans.”

Tom asked him to explain.

“It’s too light! No matter how good the suspension is at trying to stay on the ground, the thing will start bouncing at about fifty or sixty.”

Tom laughed out loud. Then he explained his recent talk with Mr. Swift. “We’re thinking on the same lines, Hank. Glad to have your opinion backing me up on this. Can you change the design to raise the inside up about two inches—I’m sure we can recline the seat a little more to let us stay inside the current maximum height—and design in both an armor plate in the bottom as well as a side-to-side and front-to-back water tank? I figure a three-sixteenths-inch steel plate plus the four gallons of water that can be held above it will just about add up to a hundred thirty pounds.”

“Sure. And that’s the weight I figured it might need as well,”

Hank told him. “But, I do have another question.”

“Go ahead,” Tom encouraged him.

“Well, why four gallons of water? Why not more fuel. Give the little thing a longer range. Right?”

“Sure. It would, but we already have achieved a ten percent greater range as it is. Besides, do you want to tell a soldier that he is sitting on top of gasoline?”

“Okay. That might be a little too much of a sales job to make. Water it is.”

After Tom ended the call, Hank called Arv.

“Arvid? Hank. I just got off the phone with Tom—”

“Oh, nuts. I wish I knew you were going to call him; I would have asked for a conference call. I know that my place is to just make the models, but I started looking at the design and I think I spotted a potential problem.”

Hearing Hank laughing at the other end of the line, Arv inquired, “What’s funny?”

“Are you going to tell me about the weight issue? Too light?”

Arv was stunned silent. Finally, he said, “I suppose that you spotted that as well.”

“Yeah. So did Tom. We’re all on the same page. He asked me to put in a sheet of armored steel and a water tank under the seat to bring the weight up by a hundred and thirty pounds.”

There was a pause while the model maker thought this over.

“Color me ignorant, Hank, but why steel? I assumed that a combination of Durastress and Tomasite will be used, perhaps even over a core of tensioned carbon fiber. That’s going to keep out just about any land mine debris already. A few millimeters of steel won’t make much difference.”

“No, but the weight will and steel armor is recognized by the military. I’ve got a friend who’s a Major in the Army and he believes that anything other than solid steel is just fairy magic and doesn’t trust it! ‘Steel’ he told me, ‘The thicker, the better!’”

“Oh. Okay. But why not add an extra fuel tank—”

“Already covered that with Tom,” Hank interrupted him, then filled the model maker in on what their boss had told him.

A few minutes later Hank was deep into the process of changing the design. *Fortunately*, he thought as he worked, *the age of drafting tables with swinging ruler arms and mechanical pencils is gone.*

That was the age in which Hank first learned his craft. Now the computer was king of the drafting lab, so making changes to an existing design simply meant figuring out what points to ‘grab’ on the wire design, locking them together where necessary so they would move as a group, and then clicking and stretching the design in the appropriate manner.

He made a series of changes trying several different combinations before he was satisfied with the new lower portion of the cabin. He committed the new drawing to a file of its own and then started on the upper cabin changes.

Three hours later—about a fiftieth of the time it would have required a dozen years earlier—Hank pressed the ‘Print’ button on his screen and got up to stretch while the smaller of his five drafting printers worked on outputting the design.

Five minutes later he was admiring his new changes. He noticed and marked a few small areas where it might be refined and he made those changes before doing another test print.

Finally satisfied, he sent the file to the larger, 60-inch drafting printer.

Knowing that it would take almost a half hour to complete that print, Hank next turned to the process of creating the

outer ‘skin’ of the treaded machine.

His computer program contained every conceivable plastic, metallic and specialty material that could be mixed and matched to provide a realistic view of the finished product.

He looked over the specifications document and found the different materials that would be used. Then, he selected each of the parts of the drawing and associated them with their correct materials.

Piece by piece, the computer began covering everything that would go into the exterior of the little tank. The powered drive chain, the treads, the external pistons and the cabin, all were soon sheathed in the proper, computerized materials.

Leaning back in his chair, Hank tilted his head slightly and admired the end result.

The craft was both sleek and retro-looking. Like something out of the pens of a comic book hero designer. Any caped, cowed or green super hero would be happy with it.

The program had even allowed him to add the ghostly figure of a man behind the front view pane and to move the apparent light source to a point where it gave the best overall light and shade effect to the machine.

“Hey, Arvid,” he said when his call to the model shop was answered. “I’m sending you the rendered machine. At least,” he said as he pressed the key sequence that would open the files to Arv’s computer, “as far as Tom’s current design goes.”

“Did you make the changes for that chunk of useless metal and the bathtub under the driver’s rump?” Arv asked.

“Yeah. All in there, as well as raising the cabin top a couple centimeters and reclining the driver’s seat another five degrees. I haven’t run any numbers, but it looks like the new total weight will be just a few pounds over four hundred thirty and the center of gravity has dropped by a couple inches.”

“I’m just calling up the image, and— Wow! What a beauty, Hank. Too bad the final versions will be all camouflage painted. That’s going to ruin the OMG factor. I sure hope that Tom lets us build one or two for Enterprises and that we get to keep the shiny look.”

They discussed several points of the design with each man rotating the finished image on their respective screens for a full 360-degree view plus top and bottom looks. In the end, Arv agreed that he would hold off making a model until Tom could review Hank’s work. “But, I’m really tempted, Hank,” he admitted.

Before leaving for the day, Hank did the preliminary marking up of the finished machine to delineate the different pieces that would go into the passenger cabin assembly. The drive components and the treads would wait. He had an intuition that Tom might be making enough changes there that any work done today would be wasted.

Arv also spent a little time that late afternoon deciding on the best methods for building both the static, not-functioning, model of the little personal tank as well as the eventual remote-controlled working model.

Knowing that it would take at least fifteen hours to make a solid model of the— He stopped and thought. Tom hadn’t given them any indication of the real name or a model or anything.

Of course, Tom’s best friend, Bud Barclay, would eventually see the little tank and give it a silly nickname, something along the lines of “Personal Wheelie Bin” or the like, and that would stick like epoxy glue to the thing, at least within Enterprises. But, at this point, Arv had no idea how to really refer to it.

He wanted to call Hank but figured that it could wait until the following morning.

Before leaving, he powered up the smaller of his two 3-dimensional printers; devices that could take a fully-rendered

design like the one Hank had provided—or even laser scans of small component pieces—and then build them in a special solution full of suspended micro particles. The printer functioned by using lasers and magnets to position the particles, layer by layer, and fusing them together until the subject piece had been built, or “printed” as something that could then be held in your hands as if carved from solid plastic.

This smaller 3-D printer could handle anything up to twelve inches long and five high—more than enough for the small model he wanted to make—while the larger machine could build things up to four feet long and wide, and three feet high.

Once warmed up, he loaded the PWB file into it, set it to build at medium density which would create something that would be fairly light weight, and pressed the Start button.

With that done, Arv went home.

CHAPTER 3/**If He Does That... What Is It *You* Do?**

THE NEXT morning, Arv arrived a few minutes before eight. After grabbing a cup of coffee, he headed to his lab. He had anticipated that the small model, barely six inches in length, wouldn't be ready until around noon. To his pleasant surprise, the model piece had evidently finished within the past ten minutes or so.

It had already been pulled from the solution by a robotic arm and was in the final stages of being dried in a warm air chamber. It would be held there until either rejected or okayed for transfer to the curing chamber.

Arv looked at the small model. Currently a single, flat color, he would hand paint it before taking it over to show Hank. He keyed in his personal code and approved the model for curing.

An hour later he returned to collect it.

Turning it over and over in his hands, Arv marveled at the precision of the 3-D printer. Even though they were a solid piece, the individual tread segments and their tiny connecting pins could be seen. He let out a little laugh as he noticed that the printer had faithfully included the ghost image of the soldier inside the front view pane.

It took just fifteen minutes for Arv's skilled hands and keen eye for colors to paint the little tank model to look almost like the computer design.

More sensing than hearing anything, Arv turned around to find Hank standing in the doorway watching him finish the model.

"Looks pretty darn good," the pattern maker commented. "In fact, *really* good."

"Why, thank you, sir. Your praise is duly noted," Arv told his coworker. "Think we should show Tom?"

"Show Tom what?" came another voice from the doorway. Arv and Hank turned to see Bud Barclay's smiling face. Bud, a former high school athlete, current test pilot for Swift Enterprises, and Tom Swift's best friend, stood there, waiting for an invitation to enter.

Arv motioned him to come over.

"Whatcha got?"

Hank and Arv were unsure whether to tell the young man anything. "This may be classified, Bud. Sorry, but we need to get Tom's okay before saying something we might regret."

"Regret what?" came a fourth voice from the doorway. They three turned to see Tom entering the room.

"Hey, hey, the gang's all here," intoned Hank.

"Skipper. We were taking a look at something that just magically appeared when this rascal broke in demanding to know what we had in our hands," Arv stated with a straight face.

"Hmmm. I see," Tom said. "Something from the model fairy? Did Bud threaten you if you didn't show him what you had behind your backs?"

Both Hank and Arv nodded vigorously. Bud looked bemused, but said nothing.

Tom held out a hand. Arv placed the model in it. "Sorry, skipper, if I jumped the gun, but the design is just so beautiful I had to see it. Hope you don't mind."

Tom looked up from the model to Arv's face. He could see the genuine concern in the man's eyes. "Oh, heck no, Arv. This is great! I came over to see if you and Hank were at some point

where you could knock one of these out for me. I want to do a little wind tunnel testing and figured if I pressed you, I might be able to get something by Monday. This is wonderful! Thanks.”

Arv beamed at his young boss’ praise. “Couldn’t have done this if Hank hadn’t powered through the changes you suggested, Tom.”

“I never threatened them,” Bud stated, evidently lagging behind the conversation by a minute or two. “What is it?”

“This, Bud,” Tom said, “is that new one-man transport I mentioned the other evening. Hank and Arv have been busting a gut to get my basic design rendered and turned into this. What do you think?”

The young flier took the offered model from Tom’s hand and looked it over. “I hope you won’t ask me to test drive this, Tom. I’d never fit.”

The four shared a good laugh. Tom told Bud a little more about the proposed vehicle—an unarmed, one-man mini tank.

Bud looked thoughtful and then held up a hand. “What’s it suppose to be called?”

Tom shook his head. “There is no actual designation right now. Just a working description of ‘One-man mini-treaded vehicle.’ Not very sexy, I’ll admit.”

Arv spoke up. “Before you start straining your brains, Bud, I’ve already come up with the nickname. Personal Wheelie Bin.”

Arv looked proud at having beaten Bud to the mark.

“Looks more like a Whirling Dervish,” Bud stated. “If Tom’s description of the speed those tracks will have to spin is correct, that is.”

Knowing that he would never outdo Bud, Arv made a grand gesture and sighed. “I give in to a superior naming force.”

“I almost forgot the other reason I came over,” Tom told the three. “Dad suggested, and I agree, that Enterprises and the Construction Company have been doing non-stop work for the last year and a bit and it’s time to have a big company party. We’re going to close everything next Friday, set up a bunch of large tents around the common area and even clear out the Barn, then let each employee bring their families in on Saturday for a giant party.”

“Is Chow making rattlesnake hotdogs or prairie dog chili?” Bud asked.

“And, Chow and all the Enterprises culinary staff will be providing a wide variety of foods,” Tom continued. “I hear that rattlesnake and prairie dog are *not* going to be on the menu. I cannot, however, promise that Chow’s favorite night chef, the man he called ‘that durned loco Russian hombre,’ won’t be doing a selection of dishes from his part of the world.”

The next day was Friday and just one week before the party prep day. Tom spent it performing a series of wind tunnel tests on Arv’s model and was more than satisfied with the results.

During the next several workdays, both Hank and Arv responded to a series of design changes requested by the military and agreed to by Tom. As they would not be required to help with the setup on the day before the party, the three met in Tom’s office to go over what all hoped might be the final outer changes to the little tanks before a test model could be made.

“We now have a semi-official designator for these,” Tom mentioned as they sat down. “The Army wants to call theirs ‘Armored Individual Transports’ while the Marines favor ‘Personal Vehicle, Treaded.’ Also, both services have now asked that a 360-degree remote machine gun be mounted on top.” Tom looked dismayed. He, like his father, disliked the use of

weaponry, but both knew the realities of working with the U.S. military often required such compromises.

“Could we get away with just providing them with the mount and controls and tell them to get another vendor to build and mount the guns?” Hank asked.

Tom thought a moment. “Normally, there might be something in that, Hank,” he said. “The thing is, they require a turn-key solution. One-stop shopping, you know?”

The following day, several thousand employees and their families converged on Enterprises. Damon had agreed with Harlan Ames’ suggestion to hire the off duty members of the Shopton Police Department to provide security and crowd containment—they didn’t want anyone wandering off, especially children.

Police Chief Slater was always pleased to authorize the hire of his men. He knew that the money would be appreciated by the off duty members of his force. It had been a lean year in the budget and he realized than many of them were hurting for the lack of a raise.

An hour into the party, Dianne Duquesne, the head of the Propulsion Department and the person responsible for everything powered by any sort of turbine, cornered Hank by the barbecue area. He was just being served one of Chow’s buffalo burgers when she tapped him on the shoulder.

“Hi,” she greeted him. “I wanted to thank you for that exquisite model of Tom’s repelatron turbine engine. It has the place of honor on my desk.” She smiled at him.

Hank sighed. “Uh, Dianne? I don’t know how to tell you this, but you’ve got me confused with Arv Hanson again. He makes the models. I make the things that make the pieces that make the engines.” He gave her a lopsided grin.

“Egad! I keep getting you two confused. We’ve worked around each other for, what? Two years? And I still can’t get it

straight. I’m embarrassed. Sorry, Hank.” She had reddened, but suddenly smiled again. “Okay, then. I want to thank you for the jigs and molds and everything you made that let us make those test engines so quickly. Without those, Tom’s project wouldn’t have come in on time.”

Hank thanked her and took his burger over to where he had spotted Arv.

As they ate, Hank outlined a little plan. Moments later the two had disappeared into the building that housed Hank’s offices.

Thirty minutes later, there was a collective gasp from a group of people nearest to the building. The crowd began parting and people were laughing at something. Soon, two figures climbed up the stairs of the makeshift stage and signaled the band to take a short break.

Arv approached the microphone and tapped it several time before asking for everyone’s attention.

As the crowd all turned, the laughter rose to a crescendo with wolf whistles and shouts of “Hubba-hubba” and “Oh, baby!” coming from somewhere near the back.

“Hi, folks,” the bikini-clad man said into the mike. “For anyone who doesn’t know me or the man next to me—” he indicated Hank who was wearing a small bathing suit bottom and had his body painted in a garish plaid pattern, “—I’m Arv Hanson and this is Hank Sterling.”

There was a round of applause and a renewed round of whistles.

“Hank and I think it is about time to set the record straight. And, this is no slam on anyone out there, it is just that you all seem to get us confused so often that we hope to give you something to remember us by, and what we do here at Enterprises.”

Hank was now standing next to Arv. Both men slowly turned around so the assembled crowd could see them fully.

“All you have to do is remember that I am a model—” Arv stated, indicating the bikini he had borrowed from a female coworker and stuffed with an extra pair of athletic socks. He struck what he imagined to be a provocative pose before continuing.

“I make models here at Enterprises. Model... *models*. See?”

“You need to shave your legs!” a voice shouted out from mid crowd.

“Thank you, Bud Barclay, for your support!”

Even people who didn’t know Bud laughed. His antics and sense of humor were well known.

“Now, this is Hank Sterling. He is all painted in a rather fetching pattern. Hank is the chief pattern maker here at Enterprises. You just need to remember him all painted up with a pattern. Pattern maker... *pattern*. Couldn’t be easier.”

The crowd let out a cheer and people applauded for a full two minutes while Arv and Hank walked back and forth across the stage. Signaling the band to strike up a new number, the two men descended the stairs and made their way back through a crowd of people all seemingly determined to stop and praise them, before finally arriving inside the door of Hank’s building.

“If nothing else,” Arv stated as the two shook hands, “that should make them remember who does what around here!”

CHAPTER 4/

Worst Case Scenario

IT REQUIRED an additional three weeks of minor change orders before Tom gave the go-ahead to Hank to finalize the design and for Arv to build a 1/12th scale solid model—one that would eventually join other models in the shared Swift office as a display piece—and a 1/8th scale remote controlled model.

Arv immediately set his smaller 3-D printer to work making the solid model. However, he decided to make one enhancement. Everything with the exception of the four outer wheels and the treads could be made in a single session.

He ‘printed’ the four corner wheels separately plus more than eighty scale tread pieces that he then meticulously connected together into a pair of flexible treads that were mounted onto the model. Even though it was suppose to be non-working, Arv felt that the addition of movable treads gave the model a better look and feel.

The next thing he did was to work closely with Hank to fabricate the more than two hundred pieces that would go into the larger scale, working model. Many pieces were fused together using precision glues and industrial adhesives while others—items that would need to be removed, replaced or otherwise disconnected in the real world—were attached using scale bolts, nuts, rivets and other fasteners.

Where the non-working model required only a half day to assemble once the parts had been printed, the working model, including the multi-channel remote control and an electrical drive mechanism powered by a miniature Swift Solar Battery took the best part of three days to assemble, test and deliver to Tom.

“All I can say is it’s amazing,” he complimented them upon seeing both models. “You’ve outdone yourselves, guys.”

Arv and Hank smiled at Tom and then at each other. Both took great pride in the quality of their work and appreciated Tom's praise almost more than the young inventor might imagine.

He invited them to be part of the round of testing that would take place the following morning.

Swift Enterprises was a four-mile-square facility that boasted eight crisscrossed runways outlining most of the perimeter of the grounds. At the north end, however, was an undeveloped area of about five acres filled with dirt, rocks and a few trees and bushes. It was at that location the tests of the miniature Whirling Dervish took place.

Tom powered everything up and set the little tank in motion. For the next half hour he ran it all around the area and even up a hill of sand he had asked to be added the day before.

As he hoped, it performed beyond his hopes and far better than scale results might otherwise indicate.

Both Hank and Arv took turns driving the machine and ended up with smiles they just couldn't get rid of, even later that afternoon when Tom gathered them in his office to debrief the tests.

"When do we get to make a real one, skipper?" Hank asked eagerly.

"I need to show both these results as well as give an actual demonstration to Dad, and then he needs to take both the results and a video to Washington. My guess is that we should be able to proceed with building a full-sized test vehicle in about three or four weeks."

"Can we do anything until then?"

"Not really, Arv. I'd hate to build something only to have the military people come back with one of their, 'Now that we've seen this one in action... can we have it in blue and with three

treads?' sort of thing."

They agreed to continue on the areas of work that could either be assumed to be set, such as the tread segments and the entire engine and drive assembly, or those areas that could be easily changed if required.

Hank and Arv left Tom and went to Hank's office.

"Where are you on the breakdown of all the outer components?" Arv asked.

"I've got everything in the computer and even got a little jump on things and built the molds for the cast Durastress tread pieces and all of the supporting tread assembly. I could build everything except for the cabin right now if I had to. Why?"

"It's just that I hate sitting around doing nothing. Sure, I have a couple small jobs to do like making a new model of Tom's Fatman diving suit. That's the one that ended up with the FBI once Harlan figured out that it was being used to smuggle out documents by that South African who posed as a janitor. They put it into storage as evidence pending the final trial, and Tom has been asking for a new one."

"Which will take you—"

"A day at most. It's the articulated arms that take the longest. They have to be just so tight that they can be moved but not so loose that they let the thing collapse." Arv sighed. "Guess I'll go do that."

He wandered out of Hank's office.

Hank had his own projects to get to, so he wasn't at too much of a loss to fill the time. After finishing up on a small jig and bending arm assembly that would be used to make parts for the newest version of the *Pigeon Special* airplane, the *Swift Racing Pigeon*, he turned once again to the personal tank.

Because he knew that most of the body parts would be made from cast Durastress that would be formed around a pre-tensioned framework of carbon fiber, he felt it prudent to come up with some sort of system to hold the internal layer in position, within a tolerance of less than a quarter millimeter.

By quitting time the following day he had devised just the thing. A series of tiny plugs made from a jellied version of Durastress that hardened in the presence of ultraviolet light; he could place them into the mold at strategic points within seconds and then set the carbon fiber shell inside the mold where it would be perfectly aligned and ready.

He documented the process so that it could be used by the Construction Company assembly team who would eventually build the hundreds of the Dervishes that would be delivered.

Before he locked the file, he thought it best to try the process himself. *Tom can't possibly argue that it is a waste of time*, Hank thought.

At that point he realized he had run into a problem. How to form the carbon fiber shell. That, he believed, was going to require both some additional thought as well as a vacuum-form mold. Once built, sheets of carbon fiber fabric could be stretched over the mold, impregnated with the epoxy resin necessary for hardness, and then formed by containing the whole thing inside an air-tight plastic sheet and sucking out all of the air.

An hour later, a pre-cured shell could be removed and placed into an oven to bake for an hour or so to fully harden it.

And that, Hank told himself, *will need to wait until tomorrow*.

He went home.

It required only about thirteen days before the Department of Defense team gave Enterprises the go-ahead to build the first, full-size test vehicle.

When Tom gave them the news, Hank and Arv were ready.

Hank knew that he could create all of the larger pieces but asked Arv to use his lab for many of the smaller bits. This system of cooperative building had led to many successes in the past and looked like it was going to help them deliver the test vehicle to Tom a full day ahead of schedule.

Any piece that could not be easily molded would be hand-tooled. Later Hank would disassemble the tank, take those pieces and use them to build molds and forming jigs so each piece could be mass produced.

The only holdup in the process was encountered when Hank remembered, right after completing the upper shell of the passenger cabin, that the military was now requesting a machine gun mount. The cabin top, as originally designed, could not accommodate such a mount, especially a retractable one that would be necessary to raise a weapon high enough to shoot over the treads on each side.

So, the day gained was lost again as Hank and Tom worked to design and model—with Arv's assistance—a retractable armature that would rise from immediately behind the driver's seat, could turn 360-degrees and tilt or lower the gun's barrel up and down almost 40-degrees.

The gun would be stored facing down and backwards, hugging the back of the cabin. The end would sit in a small indentation and would be effectively protected from dust and even water. Their system allowed the gun to be pulled up and swung around, ready for action, in less than two seconds.

For this test vehicle the actual gun didn't need to be fully operational. All Tom wanted to prove out was the ability to move up and down and swing around. A dummy gun, cast in resin from a replica gun Arv purchased from a local dealer, was mounted for the test.

Tom, Hank and Arv, this time accompanied by Bud and Mr.

Swift, headed out to the north wall and the test area.

“Heads I get first crack at it,” Bud suggested reaching into his pocket.

“Not this time, Bud,” Mr. Swift told him. “Tom’s going to just drive it slowly around here to check for track control and then we pack it up and go out to Oregon.”

“Oregon?” Hank, Arv and Bud said in unison.

“Sure,” Tom replied. “On the central coast out there is one of the largest sand dunes in the northern hemisphere. Forty miles long and a few miles wide with some dunes higher than four hundred feet tall. It’s a national park but they allow all sorts of vehicles on it. Dune buggies, snowmobiles, even some people using modified snowboards ride down hundreds of feet of sand. Dad made arrangements a few weeks ago. We’ll have it all to ourselves both for safety and security reasons.”

“It should prove the merit of this little tank,” Mr. Swift said. “They’re due for some rain the day before. If it can’t get up and down those wet dunes, then it will certainly have problems with muddy hills. We need to know the extent of its capabilities, even if it fails the test.”

“I guess that the specs call for it to be all-terrain and all-weather, right?” Bud asked.

“Correct, Bud. Okay, Tom. Climb in and fire it up.”

Tom walked forward in between the tracks, opened the front of the compartment and climbed into the reclined seat. In a moment he had fired up the small Y-4 engine—specially muffled so that it merely purred like an overly noisy cat—and then grinned and waved at his audience. They had moved away so that Tom could proceed straight ahead once ready.

A five-minute test run showed Tom all he needed to know. As he exited the tank, he was all smiles.

“Hank. Arv. You’ve outdone yourselves. This little thing handles better than I expected. It’s quiet enough inside to allow almost anyone to fall asleep and smooth enough even going over some of those four and five inch rocks out there it wouldn’t wake a baby.”

The following day the same five, plus Sandy, Bashalli and two technicians from the department that had hand-built the Y-4 engine and drive train packed up and headed west in the Sky Queen.

Seven hours of testing by Tom, Bud, Arv, Hank and even Mr. Swift proved that the little vehicle could handle anything.

Exhausted but happy, they packed back up and headed home.

“I wish Daddy had let me try it,” Sandy said, favoring her brother with a little pout. She and Bashalli had been an interested audience for about an hour and then had returned first to the local airport and then spent the rest of the time shopping and walking round the little town of Florence.

“Make you a deal, San,” Tom said to his younger sister. “Next week we’re taking it out to New Mexico for some desert trials and to show it off to the military. You clear it with Dad and I’ll make sure we go out a day early so that you and even Bash can give her a spin.”

Sandy gave Tom a quick kiss on the cheek and then turned to Bashalli. She gave the dark-haired Pakistani girl a sly wink and a little nod.

Sandy knew how to manipulate her brother.

CHAPTER 5/**Speed Doesn't Kill, But It Sure Hurts**

“LET'S BE CLEAR on the operation,” Tom told Sandy and Bashalli the following Tuesday. They had arrived outside of the Citadel—the sprawling atomic research and energy station owned by the Swifts and operated under the auspices of the Atomic Energy Commission—that morning.

After unpacking suitcases for their three-day stay, Tom and Bud drove the girls in one of the plant's utility trucks out to the site where the tank trials would take place. Earlier, the Sky Queen had set down and unloaded both the Whirling Dervish as well as a support trailer and a set of collapsible viewing stands.

The foursome stood in front of the Dervish while Tom went over all of the controls. There were only two to worry about, he told them: a hand-operated throttle on the left and a joystick-like handle on the other side to control all motion of the treads.

“The computer takes care of controlling the treads individually. If you think you're getting into trouble, hit this red button,” he said indicating an inch-wide knob on the right arm. “It puts this into auto mode and will stop you as quickly and as safely as possible.”

The girls let Bud take the first turn and sat under a large parasol watching the dust cloud he raised as he raced around in front of them.

As Tom was calling him in, Hank and Arv wandered over to the stands.

“Hi, Mr. Sterling, Mr. Hanson,” Sandy greeted them.

“Hello, Sandy. Bashalli. You both look nice even if you are wearing those unflattering overall things Tom insisted on.”

The girls made a face. Neither one liked the shapeless garments, but had agreed that they would be preferable given the dusty conditions.

“Where are yours?” Bashalli asked. “Surely, Thomas is going to allow you to take a turn in the vehicle which I understand you were both instrumental in building.”

“Got them in the truck. We'll get changed when you are out there. Oh, here's Bud now. Guess one of you is up.”

Sandy and Bashalli had already agreed that Sandy would take the first drive. Bashalli was very game for anything, but understood that in cases such as this, it was always Swift first, and she didn't mind it at all.

Bud popped out and Sandy got in. She pressed a small lever and the seat slid forward to a position that felt right to her. Giving a thumbs up sign, she closed the hatch, fired the engine up and set the Dervish moving.

Ten minutes later, she came back and reluctantly relinquished it to Bashalli. Bash was more tentative at first but soon got the hang of driving using a joystick. Sandy, being a pilot, was quite use to that method of control and had taken to it right away.

By the time Bashalli returned she was beaming with pride. “Oh, Tom,” she exclaimed throwing her arms around his neck and giving him a big hug. “I didn't have any problems with it at all!”

Tom returned the hug and told her in a low voice, “I'm proud of you, Bash. You were great!”

“My turn,” Arv said. “I won the toss.”

He climbed in and pulled the front closed. In a few seconds he was scooting off across the desert. The radio crackled to life inside the control trailer. Tom went inside and answered it.

“Hey, skipper,” Arv’s voice came through. “Is it okay to open her up and try a full-speed test? I mean, we’re going to have to do that when the brass gets here tomorrow anyway.”

Tom gave his permission. “Just try to avoid any big rocks or cacti, Okay?”

“Roger that.”

They could all see that the Dervish was speeding up as it traveled from their right to left, about a half mile out. As they watched, Arv made a high-speed and wide turn and was traveling back in the opposite direction seconds later.

In horror, they saw the little vehicle suddenly bounce into the air, hit on one side and go tumbling across the desert.

“You girls stay here,” Tom ordered. “Call Dad and get an ambulance out here. Hank, Bud. You’re with me.”

The men jumped into the pickup Tom had arrived in and, kicking up a cloud of dust and rocks, sped out across the three-quarters of a mile to the site of the accident.

Tom slammed on the brakes and the truck skidded sideways coming to a halt just a dozen yards or so from the now-upright tank.

Jumping out, they were amazed to see the front hatch open and a sheepish Arv Hanson climb out.

Stretching to the left and then the right, he stated, “I think I found something that needs a little work, Tom.” He motioned back toward the tank that looked completely unfazed by its recent tumble. “At high speed the treads pull in automatically. Right?”

Tom nodded. “Yes. The faster you go the narrower the overall width becomes.”

“Well, I would suggest that you make that either something

that can be overridden, or add some stability control software that can pop the tracks back out wide if the thing starts to go over.”

They could hear the approaching sirens of several emergency vehicles from the Citadel, including an ambulance. Once it arrived, Arv sat in the back of the ambulance while the attendants checked him over. He continued his explanation to Tom.

“I was going along just fine until I hit about ninety. The tracks had contracted so close that I could only see straight ahead through that little slot and didn’t see a rock on my left. I hit it with one track and up and over I went.”

Tom was chagrined. It had been his decision to make track contraction automatic and hadn’t given lack of visibility any thought. He promised to make that a priority.

“How are you feeling?” he asked his model maker.

“Stiff. Sore. Tired. Jostled and shaken, but okay I guess.” He looked at the ambulance attendant who nodded his agreement. “How’s the little beast? Do I need to get back home and make any replacement parts tonight?”

“Actually, your little tumble, which we caught on video by the way, is a great testimony to the strength of the thing. Assuming that you can be there for the demos, tell a little white lie that it was a planned maneuver and prove that you survived with only a few bruises, I think you’ve given us much more test data than I could have hoped for.”

Slowly twisting at the waist to check how he felt, Arv grinned. “Happy to be of service, skipper.”

Hank poked his face into the back of the ambulance. “Got her all checked out, Tom. Only have a small problem with that makeshift gun mount. We lost the little gun. It was just a resin model and the plastic didn’t stand the stress. Want me to have another one molded and shipped out tomorrow morning?”

Tom pointed over Hank's shoulder. "I think I saw it over there. Clean it off and epoxy it back on if possible." He left Arv and Hank to talk while he checked the vehicle out himself.

"Show off!" Hank kidded his friend.

"Tom says we have lots of good test data from my little spin," Arv countered.

"Teacher's pet!"

Arv thought for a moment. "Yeah. Can't argue with that. Tom always liked me best!"

The two talked about Arv's experience. Hank immediately saw the issue with the narrowed track setting. Being an accomplished mechanical engineer, he could picture everything that would have gone into the crash, and what needed to be fixed to avoid it in the future.

"I'm not sure that the tracks should be brought in as close as they go. At least, not with the thing moving very fast. Maybe in order to creep through tight spaces, but at high speed you need a bit more stability as well as visibility."

They discussed the issue for some minutes before Arv snapped his fingers.

"HUD," he exclaimed.

Hank looked askance. "Hud?"

"Not Hud. H. U. D. Heads Up Display. The technology that projects instruments and weapons systems data on the canopy right in front of a fighter pilot. Mount a high-definition camera right under the gun so any time when you need see ahead to drive with the tracks pulled in you still have full visibility."

When they brought the subject up with Tom later that afternoon, Hank added, "... and the right camera could provide night vision as well!"

A large military transport jet arrived at the airstrip the following morning at precisely eleven o'clock. Hank told Arv, "I'll bet those guys circled around out of sight until just the right moment so they could land right on time."

After a meet and greet session with Tom, Mr. Swift and Hank and Arv, the two-star general leading the group of eleven officials suggested that it might be time to see the little tank.

"Take us to see our new MMT, please," he requested.

"Uh, sir? MMT? What happened to AIT and PVT?" Tom asked, referring to the Army and Marine designators.

Smiling somewhat ruefully, the general told him, "Congress stuck their noses in and demanded a single nomenclature for the vehicle. Final funding approval seems to be contingent on saving a buck or two rather than allowing the services to use our own naming conventions. Oh, well. Manned Military Mini Transport is the final name for them." He sighed looking like a man tired of playing the political game. "What have you been calling them," he inquired.

"Well... we gave them the nickname of Whirling Dervishes, sir. Strictly inside the company that is."

A small grin played across the general's lips and he gave a small snort. "Actually," he managed to get out a few seconds later, "I like that a little better. I'm sure that the troops will give these their own nicknames." He muttered something else that nobody caught.

The demonstration was conducted with Bud driving the MMT for a fifteen minute session, and then plans were to allow a few of the dignitaries to take a short, slow drive to show them how easy it would be for anyone to master driving them.

A few hours later, the general and the others shook hands with Damon and Tom and prepared to leave. Standing at the bottom of the stairs of their jet, the general said, "Let me be completely frank with you. The MMT *looks* just like we

thought it would and *drives* just like we thought it would, but I am going to suggest that the program be cancelled.”

Tom and Damon were stunned.

“I don’t believe that your vehicle will be what the Army or the Marines actually want!”

CHAPTER 6/

Try, Try Again

AS THE JET, taxied away and took off, Tom and Damon stood in silence.

“I don’t know what to say,” the older inventor said eventually. “That came completely out of left field.”

Arv, Hank and Bud came walking over. They had been hanging on the perimeter and had not overheard the general’s startling statement.

“What’s going on, Tom?” Bud asked seeing his pal’s face.

Mr. Swift filled them in on the bombshell pronouncement. Nobody could think of anything useful to say so they all stood in silence for more than five minutes.

Hank nudged Arv in the arm. With his head he motioned that they should leave the others alone. Both men walked off the tarmac and over to the small control tower building. They took a seat in the small lounge on the main floor.

“Well, that *certainly* didn’t go as planned!” Arv stated. He looked at Hank, trying to judge the other man’s current temperament. Though outwardly cool and even-tempered, Arv knew that Hank sometimes seethed inside when faced with either stupidity or in frustrating situations such as this one.

Hank was sitting, staring straight ahead at the door through which they had entered. Arv glanced over at the pattern maker’s neck and could see the throbbing artery, a sure sign that Hank was angry.

Finally, Hank took a deep breath and quietly said to Arv, “Ever wanted to have a private stash of surface-to-air missiles?”

Arv nodded. “There’s got to be some mistake. We did everything they asked for. Even the machine gun mount. *And*, they loved our ideas about the camera. What bug crawled up that guy’s backside? How can he tell Tom and Damon that he’s going to try to cancel the whole program?”

Hank let out another sigh and turned to face his friend. “This isn’t the first time a project has been pulled out from under us and it probably won’t be the last. Let’s just let Damon get to the point where he makes a few calls to Washington. My bet is that that general is barking out the wrong orifice. Damon will get this straightened out. You’ll see.”

It was the following morning when the senior Swift placed a pair of calls to people he knew in the nation’s capital.

The first was to Senator Quintana, the senior solon from New Mexico. The senator was shocked at the news. “That’s preposterous, Damon,” he stated. “The general was way out of line telling you anything like that. It isn’t his call. He was just supposed to witness the demo and then bring back the check-off list with a whole bunch of nice tick marks to show folks back here that you did everything we asked.”

“We never saw any check off list, senator,” The inventor told him.

“Well then. Unless he’s got a really good reason, he’s about to find out the meaning of ‘sudden retirement’ if I have anything to say about it!”

The next call was placed to the Undersecretary for Military Procurement with the Department of Defense.

“Peter. I don’t know what to make of all this, As you can imagine it came as more than just a shock. No explanation, no ‘it doesn’t do this or that,’ and not even a real reason. Just that he was going to suggest canceling the program, and goodbye!”

“Damon,” the politician said, “you say you’ve already contacted Senator Quintana? He’s number two in the hierarchy

on this project, so if he didn’t tell you that what the general says, goes, I think you can assume that the general’s opinion will be ignored and the project will go ahead.”

Three days later, the Undersecretary called with some additional news.

“Forget what I told you, Damon. The general evidently convinced the Army to drop out of wanting the MMTs. He issued the cancellation order the same day as your demo during his flight back to Washington. The Marines may follow suit since the per unit cost will go up based on the order being cut practically in half. Sorry.”

As he was hanging up, Damon heard a knock on the office door. Hank poked his head inside.

“Got a minute?”

Motioning him over, Mr. Swift sighed, then cleared his throat and asked, “What’s on your mind, Hank?”

Sitting down, Hank also cleared his throat. “You know that I have a good friend in the Army. Well, I just received a call from him. He works in Roanoke at the same headquarters building as our favorite general.”

“Okay... What did he tell you?”

“He overheard a bathroom conversation between the general’s adjutant and the Chief of Materials. Evidently, the gist of it is that the general flat out lied to the big wigs back there. Told them that the Dervish failed every test and even brought up Arv’s tumble as proof that the thing is, as my friend overheard, ‘a deathtrap for our troops!’”

Damon sat back, stunned at the news. At that moment, Tom came into the office.

“Trent told me you were in here, Hank. What’s going on?”

The pattern maker filled Tom in on what he just told Damon. The three contemplated what this might mean. Finally, Hank suggested that they call the Undersecretary or Senator Quintana and let them know.

Both calls were made and both men were angry at the turn of events. The Senator promised to get back to them within the hour.

By the time his call came, Arv had been invited to join them. The four sat around Damon's desk listening to what the Senator had to tell them.

"The general has just been relieved of duty. It looks as if he may be charged with gross dereliction of duty and most certainly with lying to a member of Congress. That would be me. I called and spoke with him and he told me the same lies you found out about."

"What does that mean to Enterprises and the Dervish— uh, I mean the MMT project?" Hank, uncharacteristically speaking before either of his bosses, asked.

"Did I hear you say 'Dervish?' As in Whirling Dervish?"

"Yes," Tom answered, giving Hank a little look. "It's our own internal designator, sir."

"I like it!" the Senator said. "Sounds a whole lot better than that miniature manned military tank or whatever MMT is suppose to stand for. That was also the general's suggestion. The committee liked the names the Army and Marines came up with. Anyway, I am calling together the committee in the next day or so to authorize a second demo—if you'll do that for us—where those of us with the real say-so can see this Dervish in action ourselves."

The second demonstration went off without a hitch two weeks later. Tom returned and called a meeting of Hank and Arv.

"The good news is that the people who matter are solidly behind us. The not quite as good news is that I came back with a list of seventeen changes they insist on. Most of them we've either thought of, like your camera and heads up display ideas, but a couple are ones Dad and I really hate."

Arv asked what those were.

"It seems that the emphasis is moving away from these just being transport vehicles to move troops in and out of battle areas. Now, they are asking that these be turned into real mini tanks complete with rocket launchers and a larger gun. Practically a cannon."

He showed them a sketch he had made on the trip back. It was a tissue overlay on one of Hank's fully-rendered pictures of the Dervish. In it, three ground-to-ground rockets were mounted to the outside of each track, stacked one on top of the other. He explained that the suggestion was that they could be drawn in next to the tracks for normal driving and extended out a foot or so for aiming and firing.

"Each loaded rack will weigh about two-hundred eighty pounds."

"Do they understand the dynamics of weight and placement and stability when those things go off?" Hank inquired. "That's going to impact aiming. And speed and even fuel economy!"

"No. And Dad didn't let me bring those up. He said we just needed to get past this point so that the project can get back on some sort of ongoing basis."

The new gun on the extendable arm was now specified as being a 20 mm rather than a 8 mm size. The difference would be tremendous. It was the difference between a light, handheld weapon and a massive, vehicle-mounted gun complete with a large magazine box for the ammo. The gun specified was capable of firing more than three hundred rounds a minute.

It also added another one hundred pounds to the vehicle.

“And,” Hank added, “that will just about blow the vehicle over backwards if you let off a good burst with the thing raised.” He snorted derisively to punctuate his thoughts.

“I say we give them what they ask for and let them see what a terrible decision they’ve made,” Arv piped up.

“That’s exactly what Dad says,” Tom told them with a slight grin. “They like the current vehicle dimensions so those can’t change. The Army is delivering a pair of launchers tomorrow and the machine gun as well.”

“Ammo?”

“Not yet, Arv. They’ll bring that out to New Mexico when we do the next demo.”

“Afraid we might drive the thing down to D.C. for a little discussion?”

“Probably something like that, Arv,” Tom said.

Back in Hank’s office, he and Arv sat at his design terminal and set about designing the new components that would allow the rocket launchers and the heavier gun to be mounted to the existing Dervish. Fortunately, specifications for the rocket launcher mechanism were readily available. Even more fortunately, they quickly discovered that a simple off-the-shelf scissor-type lift mechanism and a mounting plate could be attached to either side of the vehicle with only three new components needing to be cast per side. Mounted to the plate would be the inner side of the launcher.

In less than three hours they were satisfied that they could build everything necessary to add the new equipment in only a couple days. They let Tom know and he asked that they hold off until they actually received the launcher and machine gun.

“I mean it this time, guys,” he cautioned them. “No sneaking around tonight and getting everything finished. Agreed?”

They agreed and promised to do no real work until the Army made their deliveries.

“He didn’t actually say anything about me *not* making a model, did he?” Arv asked in feigned innocence.

“No... not as such,” Hank had to agree.

The two conspirators finished constructing the wire design and then added the outer coverings to everything. Leaning back to admire their work, Hank said, “Perhaps if you don’t do the moving tracks this time. Huh?”

Arv agreed.

“Your printer or mine?” Hank asked.

“Let’s send it to mine. The larger one. I got Tom to let me upgrade that one a month ago with the ability to make density and weight changes. We just need to attach some weight info to things like the gun and launcher pieces.”

Hank was taken aback. He had thought he had all the latest and greatest equipment. “It can make individual bits lighter or heavier?”

“Yep.”

“Damn!”

They transferred the file to the 3-D printer in Arv’s lab and went over there to finish the process. It took just a minute to add weight numbers to the launchers and gun. That finished, Arv started up the printer, and they left for the day.

“Got to get me one of those,” Hank said to himself as they were leaving.

CHAPTER 7/**Off for Mass Production... Whew!**

EVERYONE from the Swift side held their breath as the demo began. As all attendees had seen the vehicle being put through its speed and maneuvering tests once before, it had been decided that only slow and medium speed runs would be made.

It was to be during these straight runs that a pair of stationary target—old transport trucks provided by the Army—would be targeted by the rockets.

Senator Quintana had been taken aside by Damon and privately briefed on concerns for the vehicle and occupant. While he understood the possibility, the Senator said, “Let’s just put it through the paces. I think you’ll surprise yourselves. You always surprise me!”

Tom had opted to take command of the Dervish. He donned a special coverall that featured a complete set of pads covering all arm and leg joints, plus a back brace. He also put on a helmet—something he had not done in any previous test run—before climbing into the little cabin. It was secured to the seat using a special self-braking cable system, and was heavily sound-proofed to block out the noises, especially from the gun.

With a wave, he set off to the start point a half-mile away and two miles down range from the target.

The radio came to life and everyone could hear Tom over loudspeakers as he announced the start of the first run.

“This will be a straight run at twenty miles per hour. I’ll launch at eight thousand feet.” The vehicle kicked up a tail of dust as it began moving forward.

“Now at ten thousand... ninety-five hundred... nine thousand and arming rocket one on port side... eighty-five hundred...

armed, locked and... launching in three, two, and one!”

The assembled group watched as a thick cloud of smoke came from the launcher on the side facing them as the rocket streaked forward, striking the target just three seconds later.

They turned to look for the Dervish. It was still hidden in the smoke cloud.

“I’ve had to stop. Can’t see a thing right now,” Tom radioed. Three seconds later he added, “Oh, and we have a small problem, now that I *can* see a bit.”

And the crowd could see as well. The Dervish, rather than pointing toward the target had been spun more than ninety degrees around by the force of the rocket launch.

A Marine Colonel, representing that branch of the military, asked to be given the microphone.

“Did the launch do all that or did you get disoriented?”

“That was all from the rocket. Equal and opposite reaction and all that,” Tom radioed back.

“Can you try another run but launch two rockets simultaneously? One from each side?”

“I sure can, sir. That could balance things out. I’m not certain what might happen, but I can get set up for that in just a couple minutes. I’m almost pointed back to the start point already.”

The people in the crowd gave a small chuckle at that comment.

Moments later, Tom announced he was ready to start the second run. “One thing. Did I hit the target?”

Mr. Swift, who had taken back the microphone called back, “You hit the very upper part of the truck’s canopy. Do you remember if you were bouncing at the launch point? Could the launchers have been aimed slightly up?”

Tom paused before answering. "It's possible. Can you ask our guests if a guided missile solution could be swapped out for these point-and-shoot rockets?"

The assembled group told Mr. Swift that it was possible, but such missiles and control systems were possibly too large and bulky. "If this becomes too much of an issue we'll drop the rockets in favor of the larger machine gun, I suppose," the Marine Colonel stated. "Maybe add them back some day."

Tom began the second run. As before, he called out his distances and the three-second countdown to launch.

This time, two streaks raced forward and hit the target broadside. As the rockets had no explosive warheads, they simply passed through the truck and tumbled across the desert. The trucks were thrown over and rolled almost twenty yards from the impact.

As the smoke cleared from where Tom was, the radio came to life.

"Can someone get out here to push me back over, please?"

With a loud groan, Hank called out, "It's flipped over. Come on. Let's go get Tom."

He, Arv, Bud and a pair of lower-rank military guests piled into one of the truck used to transport them all out to the test site. In a minute they arrived at the Dervish.

"Turned turtle," one of the young officers observed.

They gently pushed the tank over to its upright position. Tom had retracted the tracks so that it was easier to do. He unstrapped himself and climbed out.

"What a ride!" he said with a wry grin. Sobering, he added, "Sorry, folks. The combined power of those two rockets just picked up the front and flipped me over backwards. I'm gonna be a little sore. The sudden stop slammed me forward against

the restraining straps."

A brief conference of everyone ended up with the government and military men agreeing that it would be foolish to increase either the size or the weight of the little vehicles just so that they could have the rockets.

"Perhaps, sirs," Tom said, "we could come up with some sort of autonomous rocket launcher version that could accompany a group of troops traveling in these. It could be heavy enough to overcome the dynamic forces. That way we keep the speed, maneuverability and everything that makes these what they were intended to be, and you still have some attendant fire power."

After considering this for a moment it was agreed that a development contract might be worked up.

"Did you still want to see the larger machine gun in action?" Damon Swift asked them.

"Is it going to have the same aiming problems?" the Senator asked.

"That is quite likely, at least in the current configuration. Perhaps a computer-guided aiming system might be added—"

He glanced around at the group. One by one they shook their heads. The Marine Colonel spoke for the group.

"Speaking for the people who will use these things, I now believe that the original specifications have been more than met. With the *smaller* gun. They're what we wanted then and what we should want now. We asked for transport vehicles and you've delivered that. My report will be to go to production for the Marines. I'm certain that my incoming Army counterpart will take my advice and okay this for Army as well!"

Senator Quintana added, "The whole strap-on rockets thing came as a result of two of our more hawkish Congressmen wanting to make this something it was never meant to be. With

rockets built in their districts! You have my full support to go ahead with this project... without the rockets.”

Each member of the visiting groups took a five-minute drive in the Dervish—the name they had been using when referring to the vehicle—before adjourning for a late lunch and conference.

Tom and Mr. Swift were asked to attend.

Bud joined Arv and Hank as they headed over to the main building and the canteen.

“Well,” Hank said as they sat eating a lunch of chicken chili and roast beef sandwiches, “that was some fun.”

“Yeah,” Arv agreed. “But, I can’t help but wish that Tom had okayed my suggested paint scheme, though.”

Bud stopped chewing and looked at his friends. Swallowing, he said, “Not sure I heard about that suggestion. What didn’t he like?”

“Bright flames running down each side. Either that or a nice red racing stripe over the top of the cabin.”

“Don’t forget the rear spoiler,” Hank added.

Bud just shook his head. Arv and Hank could come up with some strange ideas.

“It really is time for you to take that vacation, isn’t it, Hank!” Bud said.

* * * * *

The following Monday, Tom, Arv and Hank met in Tom’s underground lab.

“I have the final list of changes the Marines and Army are requesting. Nothing too out of line. I think you’ll like a couple of them.”

They read through the list:

FOR ARMY/MARINE MINI MANNED TRANSPORT—

- 1) Remove entire machine gun mount retaining articulated armature with all-weather day/night vision camera: minimum resolution-10 megapixels
- 2) Incorporate Swift-suggested HUD as per verbal description. Actual displayed instrumentation list follows {see page DD-1943A-1}
- 3) Add upper view pane of at least 18-inches wide by 14-inches front to back between hatch and camera arm. Polarize to reduce heat and glare from overhead sun
- 4) Widen front view pane from 22-inches to 24-inches. Increase height from existing top point additional 1-inch
- 5) Add 1/2-inch additional lower seat padding. Submit suggested materials for committee selection no later than ten days from above date
- 6) Affix MilSpec plate to lower-rear of occupant capsule. Specific information and order list follows {see page DD-1943A-2} Physical model name to be prominent by 14 type points. Name: A/M MMT Dervish - Model 1

EPILOG/**Debriefing**

“I’M NOT SURE what surprises me more,” Hank was saying to Arv as they sat in Hank’s living room having a beer a few days later. “That the military guys backed off on all the weapons as quickly as they did, or the way Tom flipped the Dervish.”

“I was wondering about that myself. You sure he did it on purpose?”

“Yeah. I ran some numbers. There’s no way even four of those rockets could tip the Dervish over backward like that. I mean, two of them with a thrust of about two hundred pounds each equals four hundred pounds.”

“Right... and since the loaded Dervish weighed just under a twelve-hundred pounds...”

They sat in silent contemplation.

“What about the spin when he fired the first one?”

Hank thought a moment. “It probably did push the Dervish around a little, but my bet is that Tom saw an opportunity and spun it even further. Just takes a flick of the wrist.”

Their young boss, a man they both believed to be the smartest person they knew, had begun exhibiting a wily streak. Both men knew that the little armored vehicle could have withstood the backward forces. Oh, sure, It might have reacted somewhat, even to the point where the unguided rockets would have ended up off target of their own accord, but still...

Arv raised his beer bottle. Hank did the same.

“To Tom,” Arv said. “One young man smarter than the entire military complex!”

“Here, here! To Tom.”

Two bottles clinked together and two men sat in admiration for the man they both called ‘skipper’ and their friend.