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Word count: 80,000

The 250,000,000 Mile Gang and the Secret Moon.

by

Derek Moody

Chapter 1

Joining.

A bright red spark shot from of the distant twank. Henry watched his father swinging the catch rope. He let out more and more of it as the red telltale came closer. Suddenly it tangled with the throwing line just behind the glowing telltale.

'Line two caught.'

Henry's father fed the rope to a winch and drew the mooring line to the belay.

'Line two belayed.'

'Taking slack.'

'Stand by Henry.'

'Yes Dad. Line three checking aim.' Henry turned and sighted along the line thrower, careful not to let his visor collide with the butt. His target, another twank, was passing about 250 metres away. Two space suited figures stood, heads towards him, by the winches on its near side. One of them waved.

'All ready workshop,' the voice was much lazier, almost a drawl. 'Time to declutch Silver.'

'Line one declutched.'

'Line two coming tight.'

Henry tensed his finger on the trigger. He had to shoot line three before line two jerked his aim off but line one must be allowed to slip or the workshop, his target, would be pulled out of place.

'Line one slipping.'

'Line two tense.'

Henry squeezed the trigger. 'Line three telltale blue launched,' he broadcast. The blue spark shot away and the power winch threw off line after it. Henry moved to the winch control. Voices crackled over the workgroup channel.

'Line two braked at 340 metres.'

'Line one still slipping.'

Henry glanced at the meter on his winch, it blurred past 300.

'Line three caught,' came the drawl again.

Henry disengaged the power and briefly applied the brake, 'Snubbing three,' he reported. Heavy mooring line was spooling off the winch now.

'Line three belayed'

'Taking slack,' broadcast Henry, setting the winch to wind in.

'Line one still slipping.'

'Start feathering Silver.'

'Line one feathering.'

Henry realised that the young voice must be his cousin, all voices sound a little different over suit com. 'Line three taking slack.' he announced. He felt the dom lurch as the tension from line two began to pull them onto a new vector. He glanced down to check his safety line.

'Line three coming tight.' It was too. If the young voice was Silver then the drawl must be his Uncle Grin.

The winch was suddenly slowing under load.

'Line three tight, take it slow Silver.'

'OK Pops,' Silver's transmission crackled slightly.

Henry applied the brake. 'Line three braked at 262 metres,' he reported.

'Line one feathering at 235.'

'Hold line one at 240,' came the drawl again.

'Line one at braked at 240.'

Henry looked along the cable he had just set. It was twanging in huge, slow waves. He could feel the dom surging slightly in response and realised that he now had weight, not much, but there was definitely an up and a down. Henry's home was now part of a giant triangle slowly turning in space. For months Brightside had been floating alone, waiting, spinning on its own axis to provide a sort of gravity. Yesterday they had strapped everything down and stopped the spin ready for the link-up. The family had been busy reorganising everything ready for up and down to change to a different direction. Now instead of walking on the insides of the walls they would be able to use the floors.

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Silver too was watching a cable. Line one had been bar tight when the two twanks had swung on just the one cable. Now it was rippling with harmonics from the link-up. 'It all looks OK in line one,' transmitted Silver, 'Have I done Pops?'

The red and green space suited figure at the belay turned and glanced at the line. 'I reckon so Silver, you can go now if you like.'

'Whizzo.' Silver unclipped, sticky-walked past the belay pad and down, crouched to hold a ring for a moment, rotated onto boot-toes and jumped into space.

Tomorrow the easy way would be to hook onto the cable and follow it to the next twank. Right now the cables were twanging far too much for that to be comfortable or safe.

Brightside was more than a hundred degrees off Silver's jump, but as it swung on its cables it wouldn't stay there for long. Silver carefully lined up to counter the drift on the suit navigator and back gassed a short correcting burst. Brightside swung around the circle and came closer.

The twank that was Silver's home had been tumbling on a single line balanced by the workshop. Now they formed a triangle with Brightside, the Bright family's twank. A triangle is safer. If one line breaks the others hold it together and there is still some G to keep things in place while you make repairs. If a single line breaks the two parts fly off in different direction and they are weightless.

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Henry saw the approaching suit jump-light first, 'Sierra, tango, bravo,' he read the flashes. 'Hello Silver,' he short-ranged.

'Hello Uncle Jack. Hello Aunt Collette. Hello Henry,' replied Silver, triggering a foot gassy to flip over for stick on.

'Hello Silver, welcome to Orbital Nine and welcome to Brightside,' short-ranged Henry's Father, 'This is Henry.'

Silver sticky walked up the side panels to meet them.

'Mum's not here,' added Henry, 'She's on shift in Central right now.' Silver was shorter than him but, 'Hey, cool suit.' Silver's suit was, well, silver. Mostly it was a matt blue-silver

that picked up and diffused light evenly. Details were mirror polished and reflected stars and lights as hard pinpoints amid the black of space.

'I don't get much choice on colour,' explained Silver 'I'm lucky I wasn't called Puce.'

'Will you show Silver around or something Henry?' short-ranged his father, 'I have to go set up a stabilisation program with Silver's Dads.'

'Sure Dad, no problem.'

'Where do Vangi and Tam and Bex live?' asked Silver.

'Red tango green tango, it's about eight kilometres away right now,' Henry thought for a moment, 'I'm not sure what our new vector will do to that.' He turned to look towards Central, 'But Vangi and Tam will be at school, they should be out soon, we could go and meet them in the Rec.'

'Great,' short-ranged Silver.

'We'll gassy, how's your tank?' asked Henry.

'Ninety four.'

'Dad, we're going to the Rec,' said Henry and then 'Silver, look for red charlie blue romeo.'

'Henry, we eat at 18:00, don't you and Silver be late. Brent and Grin are eating with us too.'

'Yes Dad. You're looking the wrong way Silver, near Aldebaran.'

They waited for a few moments until Brightside completed a circuit so that they were moving in nearly the right direction then they walked off the back of the twank. Henry used his suit radar to calculate a course correction and they gassied up to fifteen knots relative.

'What are all those lights over there? Silver was indicating an area about ten kilometres away, busy with flashing lights.

'Most of the industrial stuff is over there,' replied Henry on short-range. 'It's hard to see but there's still about a third of a small asteroid in the middle of those lights. They're fitting water tanks into it to make a really big bubble. There's a mirror ship due here any day from Orbital Three to melt it.'

'And these lights sunside, what are they?'

'Doms, multidoms mostly but there are a few combos. Er,' Henry checked his suit radar, 'Vangi and Tim live in a lab combo on the north edge of that farther cluster, there, do you see red tango green tango? It's actually easier to spot red tango blue lima, it's the only blue one in that area.'

'I see it, but we're not going there are we?' short-ranged Silver.

'Not now,' confirmed Henry.

'Why aren't you in school too?' asked Silver.

'They let you have time off for spacejock duty.'

'Whizzo.'

'Umm, yes. Now monitor channel 12 and see how we contact traffic.'

Silver added the channel and gazed around as Henry requested a landing pad. They were approaching a triangle of two huge rock bubbles and what had once been a cargo ship but was now a mess of added tanks and pods. These all flashed red charlie; red charlie blue romeo was the larger bubble.

'Charlie Control this is Henry Bright. Two suits incoming charlie for charlie romeo.'

'Henry Bright, this is Charlie Control. Pads four and one,' replied a synthesised voice.

'Four and one,' Henry acknowledged.

Two square pads lit up on the massive central hub, 'You take number one,' short-ranged Henry.

They flipped, gassed down to drop speed and stuck on. Silver followed Henry into a line-lift that waited until they hooked on then drew them in the direction of charlie romeo which was down by the time they plunged into a parking slot facing an airlock. Once through the lock they unsuited in the rackroom and plugged their life support systems into recharge.

'Flesh?' asked Henry, sticking his hand out.

'Flesh,' said Silver and shook his hand carefully.

'I say, how old are you?' asked Henry.

'Three and ten.'

Which means Silver had orbited the sun three times taking ten Earth years to do so.

Everyone off Earth counts birthdays like this. In the asteroid belt each station orbits at a different speed so the only way to keep track is to use Earth years.

'Oh, I'm two and three quarters and twelve,' said Henry. Silver followed as he mugged down a ramp. 'The Refec's right here. It looks like school's just out, we'd better grab a table before it fills up,' and he plunged in among a sea of people.

Chapter 2

Welcome Stranger.

'Hello Henry, I thought you had the day off to help rig your dom today.'

'Hi Vangi. Done that. We left our dads to tidy up the cables and get the spin right.'

'We?' Vangi prompted.

'I brought Silver over to see the Rec and say hello,' Henry looked round. 'We were together a second ago.'

Vangi pointed. 'Is that Silver, in the grey jump-suit, talking to Barry Pitt?'

'Oh no. I'll go and...'

'No. I'll go,' interrupted Vangi, 'Tam's got table nine, help him keep it 'til we get there.'

Henry went.

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'You're new. Who are you?' the speaker was a large boy wearing a holo suit that gave the illusion of huge, bulging muscles. As far as Silver could see his own arms were podgy rather than muscular.

'I'm Silver, who are...'

'Why are you wearing that rag?'

Silver looked down. 'This? It's just a...'

'You gotta get some style if you're staying here.'

'Hello Silver,' Silver looked up. A girl had come out of the crowd and spoken. 'I'm Vangi,' the girl continued. 'Welcome to Orbital Nine. You look taller on Vid.'

'Hello Vangi. You look different on vid too,' said Silver.

'People always do,' Vangi agreed.

'How come you two know each other?'

'We just do Barry,' said Vangi, 'It is allowed you know.'

'Huh. Style deficient and mentally deficient. It figures. You should make a team,' he pushed off from the wall and mugged over to a rowdy table in the corner.

'Who's he?' asked Silver, grimacing.

'That's Barry Pitt. Tam says he's more mouth than trouble. Watch out for his big sister

though. Don't let them get you on your own.'

'Who are all these other people?' Silver waved at the the busy tables and the rowdy queue for snacks and drinks.

'Oh, mostly they're from school. We only got out a few minutes ago. Loads of us come up here every day. There won't be many grown-ups in here until the shift change in three quarters of an hour,' Vangi thought for a moment. 'You've not been around people for a while have you?'

'We did an eight month transfer orbit, me and my dads,' said Silver. 'There aren't this many people at Orbital Twelve either.'

'I know what we'll do,' Vangi spoke to her data-strap. 'Message: Henry, Tam, Change of plan. Silver and I are going down to the Torture Chamber. Grab a couple of sarsps and bring them to us there. End message. To Tam, To Henry: Transmit.' The strap pipped. 'Come on, this way.'

'Um, Torture Chamber?'

'Yeah, really it's the public gym, no one will be in there now. We can use the spectator seats.'

Silver followed Vangi out of the door and down three ramps. They stuck themselves in a row of seats at one end of a huge room. Soon Henry arrived miggig with a smaller boy, their long, shallow, sliding, bounds taking advantage of the low gravity.

'That's Tam,' said Vangi.

Tam looked remarkably like Vangi, his older sister. Silver didn't know it yet but their little sister Bex has the family nose and hair too. 'You all look different on vid,' said Silver.

'That's what I said. Everyone does,' replied Vangi.

Tam tossed two cups towards them. Vangi caught one and the other stuck to the nanopad on the back of an empty seat until Silver pulled it free. Meanwhile Tam jumped into a triangle of vertical trampolines then bounced between them getting higher and higher. At the top he flipped and tried to sticky-walk on the ceiling. He only got two steps and did a seven percent G tumble to the floor.

'Ha!' said Henry. 'Tam Tarr: No points,' He stuck down. 'I got banana muffins, is that

OK?'

'Banana! Yes please, I haven't had banana for ages,' said Silver.

To make up for falling Tam somersaulted into a seat and stuck there upside down. 'Why not?' he asked.

'We were on ship 'ponics and synths for most of the trip,' Explained Silver, through a mouthful of crumbs while twisting open the top of the cup.

'Oh grue,' said Vangi. 'Didn't you grow any flavour squashes?'

'No seeds.' Silver sipped, 'Hey, what's this?' Henry and Vangi looked at each other.

Tam missed the look. 'It's a sarsp, you must have had sarsps.'

Even Tam fell silent for a moment at Silver's head shake. 'No, we didn't have sarsps at Twelve,' said Silver. 'It's nice, tangy, I like it.'

'No sarsps,' breathed Tam finding his voice again. 'No sarsps, that's awful.'

'I think that settles it. Tam will never be an explorer anywhere you can't get a sarsp,' said Henry, 'Silver ran the primary line-slip when we rigged the triangle. I launched line three'

'Cool, but no sarsps is beyond.'

'Beyond what?' asked Silver, 'It doesn't make sense.'

'It doesn't have to make sense when he's that way up,' Vangi began. 'Silver I've been trying to work it out...'

Tam interrupted his sister, 'No sarsps doesn't make sense, that's what. That's deprivation that is.'

'Shut up Tam,' said Vangi. 'No, Silver, if you came here on a Hohmann orbit it ought to have taken a lot longer than eight months.'

'Dad says it's a hyperbolic I think. He says the sums are the same but you delta into arrival orbit before aphelion.' Silver saw Vangi's frown. 'You could ask him if you like.'

'That could be right,' said Henry. 'You won't have done them yet Vangi, they use a lot more delta though and there isn't an aphelion.' Both Henry and Silver's data-straps pipped. Henry read the message first, 'I've got a new address,' he said.

'Where?' asked Vangi, reaching for her data-strap. Tam struggled to right himself so he could update his as well.

'It says here that the new triangle is red bravo,' said Silver. 'What was it before?'

'Yellow bravo. Red means we're multi-component,' explained Henry.

'Who's is the other dom in the triangle?' asked Tam.

'It isn't a dom,' said Henry.

'It's my dads' G workshop,' explained Silver.

'And we're going to make a micro G shop at the hub,' said Henry. 'That's why my dad bought all that foamed rock glass that yours is storing for us.'

'Cool, so we jump into the hub and take a lift to your Dom?'

'No Tam, we're not that grand, not yet,' said Henry.

'Pops said we'd have a winch to get massy stuff in and out of the G shop,' said Silver.

'But you'll have to slide the line to come visiting,' said Henry. 'And hand climb to get out.'

'So which one's which?' asked Vangi.

'We're red bravo green bravo,' said Henry.

'It says I'm red bravo green tango,' added Silver.

'So what's the workshop?' asked Tam, 'Red bravo yellow whiskey?'

'Dunno,' said Henry. 'Probably.'

'Then what will you call the micro G workshop if you've already used whiskey?'

'Tam,' Vangi sighed. 'Use your other brain-cell for a change. It'll be at the hub.'

'Oh, yeah, of course, it'll just be red bravo,' said Tam.

'Well, there'll be some sort of yellow,' said Silver. 'We had a yellow iso before.'

By 'yellow iso' Silver meant a yellow isophase light, one that is on and off for equal amounts of time so: on for five seconds, off for five seconds, on for five seconds and so on.

Tam added a shortcall to his address book, 'Add Loc, Silver Tarr-Bright, shortcall Silver,' he said to his data strap then he realised there was still something missing. 'What's your suit ID Silver?'

'Wait 'til you see Silver's suit,' interrupted Henry. 'I think it's an ordinary Astron but it's a really great custom finish, two shades of silver and mirror details.'

'I don't get much choice on colour,' explained Silver. 'I'm lucky I wasn't called Puce.'

Henry looked a little surprised but said nothing.

'Wow, let's go see,' Tam let his data strap snap back and swigged the last of his sarsp.

'We'll see in a few minutes Tam, finish your sarsp first,' said Vangi. 'Oh you have, well let me finish mine. What is your suit ID Silver?'

'I'm sierra, tango, bravo at Orbital Twelve,' said Silver. 'I've still got that up but I'm not registered here yet.'

Henry queried his data strap. 'There's no sierra tango bravo here,' he said. 'You may get to keep it.'

'That would be good,' Silver waved at the rows of seats. 'Why are there so many chairs in here?'

'For people to watch sport,' said Tam.

'They can move the floor away and the roof up to make it bigger,' explained Vangi. 'There's a meeting room up there,' she pointed. 'And the theatre underneath.'

'There are a lot more chairs too. It's because this is the main refuge if we get a really big solar flare,' added Henry.

'This must be the biggest room I've ever been in. It's nearly as big as my dads' twubble,' said Silver. 'But this must get to be huge.'

'You've got a twubble?' Tam was impressed. 'Can we go see?'

'The torture chamber is only closed down like this because there are things going on in the other spaces,' said Vangi. 'Tam, you can't go see Silver's twubble today,' she looked at Silver. 'Maybe tomorrow or the next day?'

'Um,' Silver hesitated. 'The twubble is packed up. I expect we'll get it out when there's a ship to skin. I could show you it but it's only a big bundle in a cargo net right now.'

'Awww,' said Tam. 'But we could come over tomorrow, there's no school.'

'No school?'

'Not 'til Monday,' said Henry. 'You were smart to pick the weekend to arrive,' he turned to Tam. 'But if you come over I expect you'll have to help setting up, everything has to be shifted for the new G.'

Silver grinned. There was nothing wrong with school as such but all those new people were scary. No need to worry about it for another two days.

'Which class will you be in?' asked Tam.

'I don't know, what classes are there?'

'You don't get to choose,' said Vangi. 'They choose for you. Tam should know that.'

'How will I know which one they choose for me?'

'They'll tell you. I expect they'll want to ask you about your old school and see your reports before they decide,' then seeing that Silver looked worried Vangi asked. 'What's up?'

'Um, I haven't actually been to school,' Silver admitted.

Tam gaped. 'What Never?'

'No, there wasn't a real school at Orbital Twelve, they were going to make one but there were only four children there and the twins are only babies,' Silver had their full attention now. 'Josh and I had sort of school classes together sometimes but he's loads older, nearly eighteen, and he went to Ceres with his family last year so I don't really know how school works. I've read books about it though.'

'How many people are there at Orbital Twelve altogether?' asked Henry. 'That's not many children.'

'I don't know about right now but there were forty three at one time,' Silver paused, calculating. 'I think there might be about twenty five left there.'

'There's lots more than that just in school,' said Tam.

'That's what I thought,' said Silver. 'In my books there were hundreds in each school.'

'Our school isn't that big,' Vangi explained. 'I think there might be nearly a hundred of us though if you count the little ones.'

'Is that where all the people in the Rec came from?'

'Eh? This is the Rec.'

'You know, up there,' Silver pointed.

'Oh,' said Henry. 'I don't think I explained very well. This is all the Rec. That up there is the Rec Refec,' he waved. 'This is the Rec Gym,' he pointed downwards. 'And school is also the Rec Study Centre. Grown ups do classes and clubs and things there when we're out.'

'And we use the theatre and the torture chamber for school too,' added Tam.

'Nearly everybody comes here if there's a big solar flare,' said Vangi. 'It's got special

shielding.'

'It gets a bit crowded then,' said Henry.

'Flare days can be good though,' added Tam. 'We have competitions and shows and games and things.'

'Though it drags a bit if it lasts a really long time,' finished Vangi.

Five men entered in a group and began setting up exercises on some of the apparatus.

'Shift change,' said Henry. 'The place will be crawling with grown-ups soon. We'd better go.'

'Yeah, let's see your suit Silver.' Tam stuck his feet out in front of him and reached for his toes so that he slowly rolled off the sticky nanopad.

Vangi gathered the cups and wrappers and posted them into a recycler slot. They headed for the rackroom together. There were grown-ups everywhere and most of the remaining children were filing through a shiplock. The last two or three nudged each other and looked at Silver curiously but there was no time for talk.

'Where are they going?' asked Silver.

'Dustibus,' said Vangi. 'We EVA, it's quicker. The dustibus goes to the multidoms first.'

They reclaimed their suits from the racks. Silver's was duly admired then they slaved their data straps and 'Wow,' Tam exclaimed. 'You've got fourteen suits Silver. Why didn't you tell us Henry?'

'I never looked,' admitted Henry. He looked at Silver's suit rating. 'Fourteen plus, that's good, how did you get to do so much?'

'I told you there weren't many people at Orbital Twelve,' said Silver, 'everyone had to do a bit of everything.'

'Even so, fourteen is a lot,' said Henry. 'I've only got twelve.'

'Vangi's got eleven and I'm a nine,' added Tam as he wriggled his fingers into his gauntlets.

Everyone starts with a suit rating of zero double minus. You get a 'suit' that is you add a number for each space suit skill you master. Cargo handling counts as one and winch operating as Henry and Silver had been doing counts as another though as they had both

done it before neither would get another suit for today's work. It only takes a hundred and ten suit hours to drop the minuses, a plus means that you have another hundred hours suit time logged for each skill. Anyone wearing a space suit to and from school every day clocks up three or four hundred hours a year so nearly all belters; people who live in the asteroid belt, have a plus rating.

'You'll probably have the highest suit rating in the school,' said Henry shrugging his life support pack into place.

Silver grinned.

'Better not brag about it though,' said Vangi, who had been busy searching for a free com channel. 'They'll find out for themselves soon enough and that'll be better. Channel 102 is free. Hat me Tam.'

Tam lowered Vangi's helmet into place and sealed it. She returned the favour. Henry and Silver hatted each other. They checked integrity then went through the lift lock together and into the line lift. As they rose towards the hub Silver heard Vangi ask for clearance to red tango for two suits. She got it at once and disappeared around the other side of the hub with Tam and their radio signal cut off. Henry and Silver had to wait until some incoming suits stuck down before they got clearance.

Henry touched helmets with Silver so they needn't use radio as there were too many other people around for even short-range to be private. 'OK Silver, look towards Antares, do you see red bravo green bravo?'

'Got it.'

They sticky walked to the pads and jumped into space.

Chapter 3

Catching up with the news.

Henry and Silver drifted clear of Central. The Rec's beacon flashed red charlie blue romeo. The other rock bubble showed hospital lights: red charlie green hotel.

'What's red charlie blue alpha?' asked Silver on short-range.

'Oh, she was the Glittering Prospect but now she's the Town Hall, the admin centre. That's where my Mum and Dad work,' explained Henry.

The jump pads on the hub stayed red until they were at jet-safe distance then they gassed up to fifteen knots relative and heard Vangi calling them.

'Vangi Tarr, this is Henry Bright. Receiving you now. Over,' broadcast Henry.

'Henry Bright, this is Tam Tarr. What kept you? Over.'

'Tarrs, this is Henry Bright. We had to wait for incoming traffic. Over.'

'Henry Bright, Silver Tarr-Bright, this is Vangi Tarr. I spoke to Mum while you were in radio shadow, she says we can come over tomorrow. Over.'

'Tarrs, this is Henry Bright. OK, I'll sort it out with my parents and get back to you later. We're nearly home now so we'd better close the channel. Over.'

Henry Bright, Silver Tarr-Bright, this is Vangi. We're home too, catch you later. Out.'

Henry and Silver retro'd as they approached the much smaller, newly joined triangle of twanks. 'It looks like our dads have tidied everything,' short-ranged Henry. 'Look the new cables are hardly twanging at all now.'

'Yes,' replied Silver. 'But they've increased the rotation. My radar says ten knots.'

Matching velocity with Henry's home, Brightside, as the triangle rotated in space proved tricky but they managed it and cycled the airlock in turn. 'I hope we get the hub sorted soon,' said Henry as they plugged their life support packs into the rackroom supply and removed their suits. 'That could be tricky if you were short of gas.'

'Yes,' said Silver, looking round curiously. 'My Dads are here already, those are their suits.'

'When you go home you'll be able to slide along the cable.' said Henry. 'That'll be loads easier. Come on in.'

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'Henry, you're just in time. Go and change then come and help me get the meal ready,' Henry's mother beamed. 'Silver, welcome to Brightside. Goodness you're bigger than I expected I don't suppose you've had animal protein for a while. I hope you like rainbow trout and we've got strawberries for afterwards.'

Silver replied. 'Hello Aunt Collette. That sounds very nice thank you.'

Henry's mother smiled again. 'Oh Silver, you are polite. You're a credit to your dads. Now you can clean up in here if you need.' She swept Silver off.

Henry looked around, amazed to see how different the dom was with the new up and down. They used to waste so much space when they were spinning on their own axis and the floors were the walls. It was strange to go down to his cubby though it was an easy drop in five percent G. He stood on one of his posters gazing at the chaos in his clothes cupboard. Everything had drifted and overturned. No time to sort it out now. He wriggled out of his jump-suit and shirt and gambled that his shorts would pass muster. He pulled on a clean tee shirt and hurried to help his mother in the kitchen.

Henry expected to help with the cooking but his mother also had a cupboard problem. The cookers, worktops and equipment were in their new positions and the meal was already cooking. His mother finished tossing a salad as he entered and transferred it to a high-sided low G bowl.

'Oh Henry, Good. Your father turned the cupboards but everything is still strapped and restrained. Can you take the balloons out of the crockery cupboard and sort out a dinner plate, a side plate and a pudding bowl for everybody? There are six of us, use the nice blue stickyplates.'

'Yes Mum,' Henry released the catch and the cupboard door sprang towards him pushed by the balloons. He carefully released the outlet on the first one and controlled it as it deflated.

His mother continued. 'I want six water glasses and four wine glasses and what are you and Silver going to drink?'

'Yes Mum. Silver likes sarsps.' He slipped the balloon into its pouch on the back of the

door and started to release the second.

'And six coffee cups. You can't have sarsps at dinner, what else does Silver like?'

'Umm, banana.' Under the balloons everything was more or less in its proper place. Henry started counting out plates. By the sounds coming through the bulkhead it was clear that his father and uncles were reassembling the furniture. 'Where shall I put these Mum, I don't think the table can be ready yet?'

'Oh, put them over here,' she frowned. 'Banana, I'll have to remember that but we haven't got any banana drinks. There's a raspberry flavour-squash ready to pick in the hydroponics module. Will you fetch that and juice it? I expect Silver likes raspberry.'

At that moment a chorus of voices announced that the dinner table was ready and could they help with laying up. Henry took his chance. 'Yes Mum, We'll get it.' Pausing only to extract Silver from the adults, he led the way down the companionway.

In the hydroponics module; that's a sort of space greenhouse, everything looked rather strange. Several of the taller plants had bashed together in the move. Some of them were tangled but most had swivelled safely as the gimbals in their growing racks turned to the new alignment. The biggest difference though was the light. Henry had helped his father move the big outside mirrors that concentrated the sunlight so they would work in the new triangle but this was the first time he had seen the result. He took a few moments to reorient himself. Where would the raspberry squashes be if he were standing on the wall? Hmmm, it must be over... 'Here it is,' he said.

'What a lot of different plants,' said Silver, looking around, eyes screwed up in the bright reflected light. 'We've only got a few types, I don't know what half these are.'

'We haven't got time right now,' said Henry. 'You ought to talk to Vangi, or Tam, they have loads of plants. Tam would be better really.' He took a harvesting knife from the tool rack and carefully cut the largest squash which he handed to Silver. 'There, you hold that while I clean this knife,' he said, doing so.

'OK,' said Silver, struggling to tuck it under one arm. 'Gosh, it's big,' and sniffing the cut stalk. 'Mmmm, that's good. Why Tam?'

'Oh, he likes that stuff. Uncle Merlin: you know, Vangi and Tam's dad, is a mediplant

technician and Tam helps him sometimes.'

'What growing headache radishes?'

'Yeah, that sort of thing but they have fun growing all the strange plants they can find,' said Henry putting the knife back in its rack. 'Right, that's done. Let's go whizz that squash.'

By the time they had extracted a jug of juice dinner was ready. The grown-ups were waiting for them

It was the first time that Henry could remember seeing his uncles in the flesh although they both remembered him as a baby. They shook hands as they took their places on the newly realigned sticky benches.

'I hear you've been showing Silver the sights,' said Uncle Brent, helping himself to salad.

'We only went to the Rec,' replied Henry.

'Yes Dad, we met Vangi and Tam,' added Silver.

'You'll see them again tomorrow,' said Uncle Grin, 'and we've been invited to eat with them.'

'So have we,' said Henry's father, 'I think Sue and Merlin are planning a family get together.'

'Oh, I nearly forgot,' said Henry. 'Dad, can Vangi and Tam come over tomorrow?'

'I don't see why not Henry. What do you think Grin, reckon we can keep them busy?'

'I reckon we might.'

Something in his uncle's voice made Henry look up, he was grinning like his name. Silver caught it too.

'What's up Pops?' asked Silver. 'Have you got a secret?'

'Not a secret,' said Henry's father. 'We have to get the workshops up and running as soon as possible so tomorrow we begin building at the hub. We've already asked Merlin to bring them, extra hands will be useful.'

'Oh right,' Henry brightened. 'I'll call them...' his mother caught his eye. 'Umm, right after dinner.'

She smiled. 'Silver dear, is your fish all right?'

'Yes Aunt Collette, it's very nice. I was trying to see how it's put together.'

'Oh.' Henry's mother was a little surprised by the response.

'I don't think Silver's ever had Rainbow Trout,' said Uncle Brent. 'We only had tilapia at Orbital Twelve.'

'I knew it was bad Brent,' Henry's mother sounded concerned. 'But I didn't realise you were short of food.'

'On no Collette, we weren't actually short of food, there wasn't a lot of choice though. It got boring sometimes, eh Grin?'

'Yeah Brent, yeast with everything. You know Collette, I reckon Silver is going to meet a whole lot of new flavours here. Other things too, everything was one variety only at Twelve.'

'What do you think will happen now Grin?' Henry's father enquired.

'I expect most of the people left there will get out at the next launch window. We may get some of them here and a few will leave for Vesta and Five before Christmas. Rather than me. It'll take them two years to get there.'

'Why can't they stay there Uncle Grin?' asked Henry.

'There won't be anything for them to mine for eight years. There was a fluke laser swipe by a robot prospector. We were expecting a nice big M class asteroid to drift by as soon as we had the processing plant ready. Instead we got Swizz, that's what we call BGC261232 which is an S with a tiny M class moon. The robot must have taken the spectrum of the moon and assumed it was the whole asteroid.'

Henry understood the problem. M class asteroids are full of metals. Refineries can make valuable alloys from them in micro G. S class asteroids are mostly stone though there is usually iron in them. You can use them to make foamed glass for building and acontice but not much else and you can make that from any asteroid. 'Why not mine the moon?' he asked.

'We did Henry, it lasted about three months,' said Uncle Grin. 'We didn't get enough metal to pay off the money it cost to set up the Orbital. The next asteroid we expect to intersect orbits is another S then there's a little C. There won't be another M class for twelve years.'

'Isn't a C good Uncle?' asked Henry, 'All that carbon and water and organic stuff is just what you need to grow food and make air.'

'They don't hold anything to sell. Orbital Twelve has enough life-support but they must

pay off their debts before they can buy a cargo of seeds and they really need seeds.'

'That's why we came now,' said Uncle Brent. 'We weren't stuck because we aren't miners or refinery hands but no one could afford to pay us to repair anything. They weren't breaking much for us to fix either as the machinery wasn't in use.'

'We did fix a lot of ships though didn't we Dad?' prompted Silver.

'Yes Silver. We got as many ships fit to travel as we could,' he agreed. 'A lot of people owe us favours but I don't expect many of them will ever be able to pay us back.' He took some more bread. 'This bread is wonderful Collette, it's a real treat. Where was I Grin?'

'You were going to tell them how the folks at Twelve will mostly have to leave everything behind and start over with huge debts.'

'Yes I was. They won't have the delta to shift it all so most of them are selling out to a company that's paying next to nothing. I suppose they'll ship out a load of new workers in twelve years time and find a ready made refinery waiting for them.'

'Umm, I don't see how that's why you came now Uncle Brent,' said Henry.

'We came now because we had the delta vee for the hyperbolic. There was no point in us staying there. According to your dad there's a lot of work here waiting for us. Especially between now and the next Earth transfer window.'

'I see Uncle, thank you,' said Henry.

Henry's father started clearing plates and Henry helped. A few moments later they brought in the sweet course. Silver's eyes were like saucers.

'Strawberries!' Uncle Grin crowed. 'We haven't had strawberries for three years. Something went wrong with our breeding stock and the plants wouldn't grow properly. Merlin said he could guess what caused it but with him being here and us not having a plant laboratory, there wasn't much we could do about it.'

'Pops,' said Silver. 'You can talk to Uncle Merlin about it tomorrow but I've a good idea what we ought to do with these right now.'

Which they did. It didn't take long.

After the meal the grown-ups settled down and showed signs of wanting to talk about things that happened years ago. Henry and Silver went down to his cubby to use his

workstation to vid the Tarrs.

It turned out that Uncle Merlin, Vangi and Tam's father had already arranged everything for the next day. After a few minutes chat they started a four handed game of FiveDRacer. They abandoned it unfinished when the uncles called Silver to leave.

Afterwards Henry started, rather half-heartedly, to sort out his cupboards and wardrobe. They were fitted on always-walls of course; walls that stay walls no matter which way the gravity goes. Even though they are always walls when the direction of up changes things do move around. Henry had not secured his cupboards with balloons so everything inside had tumbled into topsy-turvy heaps. A box of nanopads had somehow got spilled among his socks turning them into a tangled lump of fabric. He was trying to extract them when his father signalled and came in.

Dad said he had come to help rotate and fix Henry's bunk but he stayed to talk a while. For some reason he wanted to know how good was Henry's knowledge of orbital navigation.

Henry would have thought little of it but later he went to say good night to his parents before going to bed. They had screened Henry's school reports and were studying the nav and astro-maths summaries.

Henry pretended he hadn't noticed but he lay for a long time in his bunk, staring into the dark and wondering.

Chapter 4

Expanding Limits.

They had hub lines rigged by the time Vangi and Tam arrived with their father, Uncle Merlin, in a depressurised cargo-dusty nearly hidden behind its huge net of panels and struts. Henry and Silver finished attaching a temporary occulting red warning light as the Tarrs decelerated. They stopped neatly a few metres from the hub plate. Vangi and Tam spojjed with mooring lines and made fast while Uncle Merlin opened the net

'Hey Merlin!' said Uncle Grin on short-range, gassing over as they finished their task and extending a hand. 'Good to see you bro, are these the kids?' He didn't kill the vector so that when they gripped gauntlets they span about the centre. 'Which have we got?' he looked at the suit ID lights. 'Vangi and Tam, great to see you.' He timed it so that he let go his brother's hand when he had the vector to approach his niece and nephew. 'No Bex? Still too young I suppose.'

'Still the same old Grin I see,' short-ranged Uncle Merlin, firing foot gassies to kill his backwards tumble. 'This, children, is the skeleton from the family cupboard.'

'Hello Uncle Peregrin,' short-ranged Vangi as he tumbled past her then gassied to a stop beside Tam.

'Not Peregrin, just Grin ta.' He somehow managed to bow in free fall and Vangi tried to curtsy in reply. It didn't work.

'Hello Uncle Grin,' short-ranged Tam. 'Is it true what Silver said about you?'

'What did Silver say about me?'

'Silver made me promise never to repeat it so I can't tell you but I wondered if it was true,' over short-range Tam sounded perfectly serious

Uncle Grin caught on and sounded sombre when he replied. 'In that case it's all true except the bit about the yellow end, Silver exaggerated that part.'

Another space suited figure had emerged from the dusty's personnel compartment. 'Well young Peregrin, where's this new grandchild you've brought me?'

'Mother!' it's hard to look astonished in a space suit but Uncle Grin managed it easily. 'I didn't expect to see you until tonight,' he short-ranged. 'Silver, come and meet your

Grandmother.'

'Hello Grandmother. It's very nice to meet you,' short-ranged Silver politely, gassing over.

'Hello to you Silver,' said Mrs Tarr, for that is her real name but she was about to suggest another. 'Why not call me Granny Ovna, that's what Vangi, Tam and Bex do?' she watched as Silver gassed to a stop. 'I usually say 'My how you've grown!' when I see one of my grandchildren after a long while but as this is the first time we've met I can't can I? Do you know how to run a number two welding robot?'

'Um, yes, Granny Ovna. I do it with Pops on number one.'

'I know his welding. I'll run number one robot then the job will be done properly.'

'Mother,' complained Uncle Grin over short-range. 'I'll have you know I'm the second best vacuum welder in the entire asteroid belt.'

'Quite. My grandchildren are not going to mess with second best.'

'But Mother, we can't afford your fees,' Uncle Grin knew he was beaten.

'Don't worry Peregrin, I'll find some way you can pay me.' Even on short-range Granny Ovna sounded smug. 'Now then Silver, help deploy my robots, we won't use your Pops' toys.'

'Hello Tarrs,' short-ranged Uncle Brent cable-spojjing along a mooring line and trailing a cargo tether. 'It's nice to see you all again. If you've finished Grin, can we assemble these panels?'

The prefabricated panels and struts had numbers so that in theory they would be easy to assemble. There were only twenty of them but each could go any of five different ways round. If they hadn't been painted differently on each side it would have been even harder to line them all up. Once in place the panels were held by clips and adjusters fitted by Uncle Brent. Granny Ovna and Silver then set a pair of welding robots to close each seam. Henry and his father placed and tensioned reinforcing cables while Vangi and Tam assisted their father in setting spacing rods and fitting inter-layer service lines. Uncle Grin looked a little lost at first but soon busied himself fitting the inner frames for the airlock and the shiplock. By the time they broke for lunch there was a spiky fifteen metre dodecahedron tethered to

the hub.

Uncle Merlin and Uncle Grin took the dusty to collect another load of panels while everyone else queued to cycle through Brightside's lock and unsuit before attacking the spread that Henry's mother, Aunt Collette, had assembled.

'Come in, help yourselves,' said Aunt Collette. 'But Vangi, please set aside a plate for your father, you too Silver.'

'Yes Aunt Collette,' said Vangi. 'Shall we pour them drinks too?'

'No Vangi, they can have fresh when they get back,' she caught Henry's eye. 'Henry, there's still some of that flavour squash that you and Silver started last night if you'd like to fetch it.'

'Yes Mum,' said Henry.

'Ooh, that reminds me,' said Silver, 'Tam, Henry said you know all about plants and we haven't got many. What sorts can we have?'

'What sorts do you want?' asked Tam.

'I don't know, really yummy ones would be nice.'

'What, like chocolate flavour squash?' asked Tam innocently.

'Tam!' Vangi sounded stern.

'Awww Vangi, you spoiled it.'

'No funny business Tam. Silver, if he comes up with something that sounds too good you check with me. There isn't a chocolate flavour squash, it comes from a bean and it's really tricky to grow. I expect Tam would have given you bitter-squash seeds or something and let you find out after you'd spent ages growing it.'

'Oh,' said Silver.

'I wouldn't,' said Tam. 'I was going to tell you all that but I was going to string you along a bit first.'

'Um,' said Silver, confused.

'Tell you what,' said Tam. 'When you come over this evening we'll take you into the 'ponics modules and you can sniff and taste and choose what seeds or cuttings you want.'

'Yeah, that's a good idea,' said Vangi.

Their grandmother interrupted. 'Now then young Silver, let's see you without your suit,' she spread her arms. 'And you can give me a proper flesh hug now too.'

Vangi and Tam glanced at each other, Granny Ovna's enveloping hugs were legendary. 'Woof!' was all Silver managed to say.

'Woof to you too,' replied Granny Ovna adding a big sloppy kiss. 'You're quite big but you need more meat on those bones. We're going to have to feed you up.' Tam made faces in the background. 'Tam Tarr I can see your reflection in the viewport, you're lucky there's no wind up here to change or you might be stuck like that. Make yourself useful and fetch me a cup of tea.'

'Granny Ovna, why is your suit ID mike hotel?' asked Silver.

'Because I was Michaelovna Hawke before I married your grandfather and I never changed it. I still have M Hawke on my business record.' She accepted the tea that Tam brought. 'Thank you. Now run along both of you and get yourselves something to eat.'

Which they did, joining Vangi who had already started on a slice of pie. She swallowed, 'Hey, what's up with Henry?'

Henry placed a tray of drinks on the table and then took a plate. He helped himself to some pie. He looked worried. 'It's Uncle Brent,' he whispered, 'He's was asking me the weirdest questions in the kitchen.'

'What sort of questions?' whispered Silver.

'About navigation and astro-maths,' He selected another portion of salad, 'Dad was going on about the same stuff last night too.'

'I thought you did OK at math and nav last year,' said Vangi quietly.

'I did. I wish I knew why they were going on about it,' He speared a pickled onion and gloomily retired to a corner to eat his selection.

'I don't think it's too bad,' observed Vangi to the others. 'He's still got his appetite.'

'It's Pops and Uncle Merlin,' said Silver as the airlock cycled, 'Lets see what they've brought back.'

They crowded the viewport, by craning upwards it was possible to see the dusty tethered to the hub with a load of even larger panels than the first lot.

'Hey Dad,' said Tam as his father entered. 'Do I get a suit for construction work?'

'I should think so,' replied his father. 'I'll report it to centre and we'll see.' He accepted a plate from Vangi. 'Thank you Vangi, is there any coffee?'

'Now?' demanded Tam.

'After I've eaten something Tam. What's the hurry?'

'He's trying to catch up with Silver,' said Vangi passing him his drink. 'Can I get you a drink Uncle Grin?'

Uncle Grin hugged his mother, this time it was Granny Ovna who nearly disappeared; Uncle Grin is a lot bigger than Silver. Then he took the plate that Silver offered him and tasted a slice of pie.

'Mmm,' Uncle Grin swallowed. 'Yes please Vangi. Coffee, whitener, no sugar.' He looked at Silver. 'That reminds me Silver, you've got a couple of suit tasks to report from the trip now that we're at an assessment centre. I'll see to it after lunch.'

'What?' Tam was dismayed. 'But Silver's got fourteen suits already.'

'Never mind Tam,' Uncle Grin chuckled. 'I expect you'll be off the scale by the time you're my age.'

'Silver will be off the scale by the middle of next week at this rate,' said Tam.

'Hardly,' replied his Uncle. 'But Silver has been doing a lot of suit work. Now, do you think you could cut me a slice of that cake please?' he turned. 'Henry, how good is your navigation?'

Henry looked horrified but submitted to a third quizzing on the topic.

When they went out for the afternoon's work Uncle Grin made sure that Silver had two mini life-support packs. 'Mother says you'll be running the inter-layer welding 'bot,' he said.

The bigger panels were even trickier to handle but fitting them went much faster as there were already struts in place to which to attach them. Silver, the smallest, removed the bulky life-support pack and switched to a mini pack to slip between the inner skin that they had assembled in the morning and the new middle skin that they were assembling. Silver's placed and operated the welding robot on the inner part of each seam in turn. As soon as Silver had finished inside each section the others slid storage tanks and shielding panels into place

leaving not much more than a crawling space for maintenance access.

The second skin made the structure a metre larger. They had nearly finished the afternoon's work; Silver had returned to a standard life-support pack and they were adjusting the last of the outer skin support struts when Tam suddenly cheered over short-range. 'I've got a suit,' he cried.

Vangi had seen Silver pause to read a message too. She watched the rating panel change on the shoulder of Silver's suit. 'Well done Silver,' she short-ranged. 'Tam, you're falling behind, Silver's got sixteen plus now.'

'Awww Sis, you take all the fun out of it.'

'Never mind Tam, well done to you too,' Vangi short-ranged.

'Thank you Vangi, and well done Tam,' added Silver who couldn't help sounding a little pleased.

'Yeah, well, OK. Well done Silver,' short-ranged Tam grudgingly.

They drifted to the end of a safety line to admire their work from a distance. The structure was bigger now and even more spiky than it had been before lunch. Uncle Brent joined them. 'We've made a good start,' he short-ranged.

'Yes,' agreed Granny Ovna, grabbing the line as well. 'At this rate we'll skin it tomorrow and get the locks in so you'll be pressure testing in 24 hours.'

'I hope so,' said Uncle Brent. 'We can't use either workshop until we get the fittings for this one out of the other and make some working space.'

'Couldn't you put them in a net outside out of the way Uncle Brent?' Asked Vangi.

'Well: yes, we could,' short-ranged her Uncle. 'But if we did that for more than an hour or two then we would have to replace all the lubrication before we could use it in atmosphere again.'

'Oh I see,' Vangi paused. 'Why are we fitting a shiplock and an airlock? It isn't very big.'

'Sometimes we'll want to work inside a ship but use tools in the workshop so a shiplock is useful but then we'll have to have a way to get in and out too, that's why.'

'Oh, I should have thought of that,' short-ranged Vangi. 'Can we go and see in the workshop, please?'

'Yes, of course you can, Silver will show you round but I don't think there's time now. Sue will be expecting us soon and we still have to net all the tools and tidy-up.' By Sue he meant his sister, Vangi's Mum. 'If you come over again tomorrow you can do what you like while we fit the airlocks.'

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They all piled into the dusty for the trip to the Tarr's dom and the get-together. Well, they didn't all fit inside, Tam and Silver rode in a cargo net and Henry's father and Uncle Grin strapped onto the rack. Uncle Merlin took the co-pilot's seat and told Henry to take the pilot's position.

Chapter 5

Expanding Possibilities.

Balancing the weight of a dusty-load of people who will keep moving about is tricky but Henry managed and soon they were stationary next to the slowly tumbling dumbbell one end of which flashed red tango blue lima and the other red tango green tango, Vangi spoiled with a mooring line. The Tarrs were home.

The Tarr's airlock is a larger model. Silver was able to squeeze in with Tam and Granny Ovna. They emerged into a long rack-room with two secondary airlocks leading off. Waiting in the open one were two people who looked like an older and a younger version of Vangi.

'Hey Silver,' said Tam as soon as he got his helmet off, 'this is Mum and Bex.'

'Hello Silver,' said Aunt Sue.

'Oooh Silver I like your suit,' said Bex. 'Tam said it was cool.' She pointed to a small red suit on the rack, 'Mine's just a Primary and it's horrible. I wish I could have one like yours.'

'Hello Aunt Susan, Hello Bex. Why don't you make your suit look cool too then?'

'Yes Bex, we've got suit paints,' said Aunt Sue. 'Oh, Silver, please call me Sue, I haven't been Susan since I was smaller than Bex.'

'But Mum,' complained Bex, 'suit paints look all icky.'

'You don't use suit paints. Well you do, but only for the details,' Silver bent back the edging on a leg guard. 'Look, these are ordinary scuff panels but my Dad, your Uncle Brent, showed me how to gel colour and polish them. You could do it too.'

'I could have a silver suit like you?' Bex asked.

'Yes,' said Silver, 'or you could have another colour or a pattern.'

'What, like diamonds?'

'Umm,' Silver frowned. 'Do you mean a diamond pattern or diamond jewels?'

'Jewels!' said Bex gleefully. 'I want diamond jewels.'

'I'm sure we could put a holopic of diamond jewels into a panel and shine it up,' said Silver. 'We'll ask my Dad in a minute.'

Bex was pulling at the arm of her suit, trying to get the red forearm panel off. 'Hey wait a minute Bex,' said Aunt Sue, gently taking it from her and re-racking it. 'We can't do it right

now, we're going to eat as soon as everybody gets in.'

The lock cycled again. Vangi drifted out followed by Aunt Collette. As soon as Vangi unhatted Tam said, 'Silver's been telling us how to make our suits look really cool too. Bex is going to have diamonds on hers.'

'Diamond jewels,' added Bex importantly.

Vangi looked at Silver, questioningly.

'That's right,' confirmed Silver.

'I'll have a gold suit,' Tam announced holding his in front of him appraisingly as he finished wriggling out of it.

'You'll have nothing of the sort right now,' said his mother. 'Rack your suit and life-support pack and set them on refresh. Let's all move down into the living module and make room for everyone else to unsuit. Come down as soon as you're ready Collette,' she added to her sister in law.

Aunt Sue and Bex had been busy while they were working on the micro G workshop, there was a feast spread ready for them.

In a few minutes, after a period of confusion while the rest of the group unsuited, washed their hands and generally tidied themselves they all stuck themselves to seats around the table that had been extended to its fullest width.

After a long and satisfying meal the grown ups settled down to talk. Vangi, Tam and Bex took Silver onto the hydroponics modules and soon loaded a clambox with cuttings, runners, seeds and even a few seedlings ready for planting. Silver was bewildered by all the scents and flavours but recorded Tam explaining them all and in any case the Tarrs would be coming over tomorrow so there would be a chance to check any awkward ones.

At first Bex was far more interested in Silver's lack of schooling. She found it strange that she, so much younger, had three years more experience. Bex gravely explained how school worked and seemed to assume that Silver would start from the beginning.

'Don't worry,' whispered Vangi in Silver's ear, 'You won't have to start over with ABC and one two three.'

Tam heard it too. 'No,' He said, 'You can skip straight to DEF and four five six.'

Bex opened her mouth to protest but couldn't think what to say. Vangi rescued her. 'Don't worry Bex, or you Silver. The teachers will find out how much Silver already knows and then choose the right class.'

'I did get to use the autoteach and vid-tutor, Bex,' explained Silver. 'So I have learned some things.'

'Oh,' Bex frowned, then suddenly grinned, remembering. 'Like how to make my suit look cool. Can we do it now?'

'Oh yeah!' agreed Tam.

'Um, we need a few things first,' said Silver. 'What I did was I got a new set of scuff panels before I needed them and I did them a bit at a time until they were all ready and then changed them all together. It does take quite a lot of time to polish the scuff panels, you need a buffing wheel. I forgot to ask Dad about it before we ate. Let's go and ask him to make a list of the bits for us.'

At that moment Henry found them, he was looking far too pleased about something.

'Where have you been?' asked Vangi.

'I've been talking to all the Dads.'

Tam interrupted. 'I bet you've been arranging to have your suit done.'

'No I...'

'That's not fair!' protested Bex. 'We thought of it first and I'm going to have diamond jewels.'

'You could have waited 'til we had all decided,' said Tam. 'I want gold with power bars'

'No, no. I haven't said anything about suits, honest,' said Henry.

'Oh,' Tam was still a little suspicious. 'Well, let's go and do it now then.'

'You go on,' said Henry. 'I want to ask Vangi something first.'

Tam and Bex dragged Silver off.

'What's up?' asked Vangi.

'Vangi, do you reckon you could get a Space-Crew Ticket?'

'I get the classes next year like you do. I expect I'll pass, most people do.'

'Yeah, some of them take two or three tries but what I mean is: do you reckon you could

get a ticket this year if I helped you with the notes?'

'I don't know. Is it hard? Why?'

'You already know most of it. It's common sense, the only hard bits are the irregular mass handling and the first aid. All the dads have said they'll pay for me to take the Private Pilot's Licence exam.'

'Wow!' said Vangi, impressed. 'But why would I need a Crew-Ticket now? You won't be allowed to hire a ship 'til you're eighteen and we'll all have tickets by then.'

'They want me to fly Stardozzer sometimes when they move a big ship...'

'Double wow,' Vangi frowned. 'I still don't get it.'

'If I pass the exam I'll have a provisional licence. It won't be a full licence until I've had it for at least a year and I have 100 hours of space command experience. I won't be allowed to fly solo with a provisional licence. I have to have at least one ticket-holding crew.'

'And you want me to be the crew. But why?'

'Er,' Henry was a little taken aback. 'It's either you or one of the no-brains from school. There are five of us taking it this year and I don't rate any of them. Mostly they're only taking it so they can use dusties.'

'No silly,' said Vangi impatiently. 'Why do they want you to take the Private Pilot's Ticket?'

'Oh. Well, any commercial vessel over, umm, I forget what it is exactly, but over a certain size must have at least two qualified pilots on board whenever she deltas. So must a tug whenever she moves a big ship. Silver's dads want to be able to work on big ships here so they need four pilots. The two of them and your dad make three. My mum has to be within call of centre so she can't often get away. Aunty Ovna does have a Commercial Pilot's Ticket but she says she'll only help out in an emergency and not on a regular basis and my dad and your mum's eyes would fail the medical. I'm the next in line,' Henry paused for breath. 'See?'

'Why not Silver?'

'Silver doesn't have the math yet.'

'What about school?'

'They let you out for spacejock.'

Vangi could see one remaining obstacle, a huge one. 'But you'd still need a ship.'

'Uncle Grin and Uncle Brent said I could use Stardozer.'

'Quadruple wow,' Vangi had forgotten how far she'd got, 'but Stardozer's only a tug.'

'A tug is still a ship. She's how they got their twanks here from Orbital Twelve.'

'Gosh,' Vangi gave up on 'wow', 'Don't you have to be twelve to get a Crew Ticket?'

'I don't think so,' said Henry. 'We could look it up.'

Vangi began to query her data-strap but then: 'It'll be quicker on my workstation, through here.' She led the way.

'So there's no age limit, I can do it,' Vangi said a few minutes later, clearing the workstation and summoning the syllabus to the screen.

'The only thing left is entering you,' said Henry. 'The classes are half over. If you can't get in this time it's six months 'til you can take the test.'

'What about you and the Private Licence?'

'I can take the theory whenever I like,' said Henry, 'Apparently there's some math I haven't covered yet and a lot more stuff like Space-Law and Collision-Regs but most of it is more of the sort of things in the Crew-Ticket and I have to do a practical. I have to book a day with the examiner for that. The Examiner is Commander Li so it should be easy to fix a day when I'm ready.'

'Oh dear, I don't like her,' Vangi grimaced. 'Lucky I won't have to do that one,' she turned back to the workstation. 'When can I have those notes? I recognise the subjects but I can't tell how much I need to know about each one.'

'That's easy,' Henry manipulated his data-strap and Vangi's screen acknowledged receipt. 'It's all there apart from the knots and the resuscitation dummy, You have to show you can do them separately.'

'I see what you mean,' she said, scrolling through it. 'A lot of this is the same stuff as suit-drill. So now I have to find out if I can join the class.'

'You'll have to ask Mrs. Sturgis on Monday,' said Henry naming one of their teachers. 'She's running it.'

'When is the test?'

'In six weeks.'

'Ooh. I'll have to get busy. When will you get your Pilot's Licence?'

'I don't know. Uncle Grin said I should be able to do it about a month after that but my dad reckoned it would take longer. They're going to coach me,' Henry grimaced. 'I'm not sure I'm looking forward to that part.'

'They might have to coach me too if I'm going to get through this in time.'

'I'll help. Watch the vid first and read through the rest. Then look at the practice paper. At least you'll already know something about it when you talk to Mrs. Sturgis.'

'OK,' said Vangi. 'We'd better not tell the others about this until it's all fixed. Tam's going to be dead jealous.'

'Why am I going to be jealous?' asked Tam leading Bex and Silver back from their quest.

'Never you mind,' said Vangi.

'Anyway it's you who's going to be jealous. I'm going to have a gold suit with steel power bars, no, a steel ex o skeleton,' bragged Tam. 'With blue discharge arcs.'

'My suit is going to be pink with diamond jewels,' announced Bex. 'Dusky pink.'

'Uncle Brent says he's already got everything except the scuff panels,' said Tam. 'We'll have to set the replicator making them but that'll take a couple of days and Uncle Brent will make the big ones because we've only got an ordinary replicator and he says he's got a big one.'

'But I'm not going to make scuffs for my suit,' added Bex. 'I'm going to make scuffs one size larger and then as soon as they're ready I can have a new, bigger suit.'

'We've got a big replicator we use to make spare parts for ships,' said Silver. 'But it takes ages to do big things. Pops says that one day we ought to set aside a year for it to make us a faster replicator.'

'Uncle Brent says he can lend us a buffer,' said Tam.

'I'm going to show them how to use it tomorrow,' said Silver. 'I need a new knee-piece so we can practice on that.'

'Why an exoskeleton?' asked Henry.

'You know, like the pirate marines in 'The War at Midnight's End', the ones from the

Death Adder,' Tam turned to the workstation. 'I'll get a picture. Hey what's all this stuff?'

'Oh, school work for Monday,' said Vangi, clearing the screen.

'It's Saturday, not Sadder day,' said Tam and summoned a holo of a horribly be-weaponed space pirate bristling with extra jets and wearing power-assist space armour. 'There, like that but gold and steel.'

'What are you going to have on your suit Vangi?'' asked Bex.

Vangi had an inspiration. 'It's a secret,' she said. 'A surprise.'

'Oh so that's what you were cooking up,' said Tam.

'You can't have pink and diamonds,' warned Bex. 'That's mine.'

'Don't worry Bex, mine will be nothing like yours.'

'Nor mine,' added Henry. 'But that's a secret too.'

Chapter 6

Silver keeps some promises.

They put the outer skin on the micro G workshop turning it into a proper twank well before lunch and began fitting external lamps and antennae. Uncle Grin attached an air bowser and blew air into the workshop until the pressure reached a third of an atmosphere; that's far too little to breathe but they would leave it like that for twenty four hours to check for leaks. Breathing air is valuable, you don't waste any. The next day they would put a third of an atmosphere into the second skin and increase the main compartment to two thirds. On the third day the main compartment would be filled to full pressure and the outer layers to two thirds and one third.

That's how a twank, a Triple Walled tANK, works. The pressure steps mean there's less force to strain each wall. The outer layer is called the whipple. It's made differently so that any dust sized meteor that gets through is smashed and goes no farther and there is not much pressure to push air out of the micro-hole it leaves. There are tiny bubbles of self-seal resin in the outer compartment too so that most of the micro-holes mend themselves. Often people fill the outer skin with argon or other cheap waste gas instead of air so there's less chance of losing nitrogen. The middle skin always holds breathing air but as all the water tanks, power cells, honey tanks and cosmic radiation shielding go in there as well there's not much wasted.

Silver took Henry, Vangi and Tam on a grand tour of inspection. The G workshop was crammed with equipment so it was rather hard to see everything and they nearly filled the remaining space but they unhatted and racked their life support. Silver brought out a power stem with a buffer wheel attached. There was a clamp into which Silver inserted a dull silver-grey knee-scuff.

'Watch,' Silver triggered the power and ran the plastic slowly over the wheel. 'See how it starts to shine?' and so it did. Silver held the scuff in one spot for a moment and it began to take on the deep, brilliant gleam that had first caught their attention.

'Can I try?' asked Tam, removing his gauntlets.

'Sure,' said Silver. 'Hold it really tight and don't press down, let it glide.'

At Tam's first attempt the clamp suddenly whipped sideways and the safety cut-outs

stopped the wheel.

'Hold tight and use it gently,' emphasised Silver.

After three quarters of an hour and several comical false attempts they could all use the buffer but the knee-scuff didn't look too good.

'It's because we've all done different bits at different angles,' explained Silver. 'It spoils the shine. I'll go over it later all the same way and it'll be fine.'

'It's a bit slower than I thought,' said Tam. 'But I can do it OK.'

'What about Bex?' asked Vangi. 'She's not strong.'

'Somewhere we have a small detail wheel,' said Silver. 'It only needs a number one power stem and Bex should be able to use that easily. It'll be even slower though.'

'Why can't we just have the replicator make the new scuffs ready polished?' asked Tam.

'We could if we wanted them all the same,' said Vangi. 'The whole point of doing this is to make them all different.'

'How do we get the design onto the scuffs?' asked Henry.

'Ha! You shouldn't have skulked last night,' Tam said, 'Or you'd know.'

'You holoprint it onto the plastic and then cover it with gel resin,' said Silver. 'That's what we've been polishing.'

Everyone's data-strap pipped at the same time. 'Lunch,' said Henry reading his first. 'Come on.' He picked up his helmet.

After lunch, at Brightside again, Tam remembered something. 'Silver, you said you had a twubble, I don't remember seeing it?'

'Oh that's in Stardozer's cargo hold,' Silver turned. 'Pops can I show them Stardozer?'

'I don't see why not,' said Uncle Grin. 'Someone ought to go and check her mooring lines,' he looked at Henry. 'She's in the Central Mooring Frame, I expect you know the way.'

Henry nodded. 'I'll go and log an approach plan, they don't let us gassy as we like in case there's a delta and someone gets tumbled.'

They were given permission to approach straight away. They soon gassed up to speed and settled down for the half hour free-fall drift. When they got close Silver short-ranged: 'There's Stardozer, second in from Sunside.'

Henry would have guessed in any case. Most of the ships in the rack were one or two-man prospectors' vessels or some sort of small dusty. Stardozer, although not the longest ship there was easily the bulkiest. She was over thirty metres long and nearly ten metres wide with a big pushing frame on her bow. 'Heads up Tarrs,' he short-ranged. 'We're here.'

Vangi had been working through the notes Henry had given her the previous day but she pretended to have been playing a game. 'Oh, right,' she short-ranged. 'Gosh, Stardozer looks the business.'

Tam really had been playing a suit-game. He was using his space-suit as a full-body virtual reality suit and had been kicking and punching vacuum for most of the trip. 'Awww, I nearly beat my high-score,' he complained over short-range. Then on seeing Stardozer. 'Hey she's bigger than I thought.'

They flipped, gassied and touched down. 'The cargo hold is depressurised,' short-ranged Silver. 'We'll go in that way.'

They sticky walked to the cargo-lock and Silver opened it. As there was no air inside Silver opened both doors at once and they crowded in. Lights came on and Henry hit the door-close button. Space ships are much smaller inside than out, so much space is taken up by fuel tanks and engines and life support machinery. The hold was already half full. With them inside as well it was decidedly crowded.

'There's the twubble,' said Silver pointing at a huge bundle that formed the greater part of the cargo.

'It doesn't look much,' said Tam.

'It's really big when it's blown up,' explained Silver. 'Stardozer fits inside easily.'

Twubbles are like twanks but they are plastic bubbles. Sometimes you need a temporary life-support structure and twubbles are it. Tam had been expecting the sort of twubble that you use when you want to spend two or three days on the surface of an asteroid. This one was made to wrap around a whole spaceship so that jobs that need an atmosphere could be done on the outside of a ship in space.

'Where do you keep all the air?' asked Vangi.

'We sold it. We couldn't delta with all the mass. Dad says we have to get a really good job

lined up so we can afford enough air to fill it again.'

There wasn't much else to see in the cargo hold so they took turns to go through the lock into the pressurised crew compartments.

'Pooh,' Tam sniffed as he unhatted in the cramped rack space. 'The 'ponics medium has gone sour,' he called.

'Yes,' said Silver as he entered the tiny hydroponics section. 'We couldn't use this unit much by the end of the trip. The yeasts and algae are OK though. We lived mostly off the vegetables from the dom 'ponics module and synth's from the yeast tanks.'

'How did you manage that?' Tam examined a sickly looking pepper plant. 'This capsicum has grown in gravity.'

'For most of the trip we tumbled with the twanks. It was only the last few days that we deployed for towing. The deltas are tricky to set up when you have two masses on the string, that's what Pops says anyway. We had to live in here at zero G for nearly the whole of the last week.'

'The beds are very near starved too,' Tam was reading the bio-monitors.

'Yes, Pops stopped it recycling near the end. He says it's better to have a full honey-tank to start off the new 'ponics than waste it on media that will be purged.'

Honey tanks don't hold honey. It's a sort of space joke. They hold more or less the opposite of honey. All the waste from the toilets and the galley goes into the honey tanks. After it has bubbled a bit it moves to a composter and eventually the purified water goes back into the water tanks. Dissolved plant nutrients are used to restock the hydroponics, algae and yeast tanks. Solid waste is used to replenish the other growing beds. Everything goes around and around on a space ship. It does on Earth too but most people don't notice or don't think about it.

'When are they purging it?' asked Tam.

'I don't know, we've only been here a couple of days and we've been busy but I expect it'll be this week.' Silver waved around vaguely. 'We were in transit for months. We'll have to valet everything.'

'Isn't that what your dads do?'

'Oh yes, but there's lots you can't do properly while you're living in it.'

#

Vangi and Henry went forward. The living module and pilot cabin were all in one. There was one main space with a tiny shower forward, a toilet cubicle and a galley-store were the only other rooms.

Two piloting seats faced controls on always walls. There were places for four other acceleration couches but only two were fitted. The galley stove had a pull-down cover on another always-wall.

Henry took the command chair and closed the lap strap. He put his hands over the controls though he was careful not to disturb any of them. 'Prepare for Delta,' he said.

Vangi took the copilot's seat. 'All systems green. Gyro's locked...!' she took a deep breath. 'It really begins to seem real doesn't it?'

'Yes,' said Henry puzzling over an unfamiliar control. 'Shh! Here come the others,' he span his chair around. 'Silver, what's this Divergence control for?'

'Oh, when we're pull towing we have to spread the plumes either side of the tow else we either fry it or push it backwards while we try to pull it forwards. Mostly we push anything we want to move so the engines don't have to diverge.'

They stayed for two hours and had a thorough look around because, after all, spaceships are interesting, even tugs. Before they left Henry checked the mooring lines, which were fine. He hung in space for a while gazing at the engines which were unusually large for a ship of that size, but then Stardozer was a tug and needed extra oomph.

On the return jump Henry downloaded Stardozer's specification and spent a while making speculative calculations. It was a pity the crew space was so spartan. With those engines, plenty of fuel and no tow Stardozer could go anywhere in the Solar System.

Chapter 7

Yes, it's true.

Monday was a strange day for Silver. Before going to school there was a medical and a selection of inoculations that tickled. 'We have a few illnesses here different from the ones you had in Orbital 12,' explained the doctor. 'So I have to make sure you don't give us anything and that we don't give you anything. It's a pity you've been around so many people already but it can't be helped.' That wasn't all. 'I'm going to give you calcium boosters to help your bones grow and you'll have to catch up some centrifuge time.'

Next came a visit to the dentist. 'Open wide.' Silver opened wide. 'Hmmm. We are a bit gappy aren't we?'

'Hay glooging gy gagy keesh.'

'Yes, your new ones are mostly coming through all right. I see the doctor has put you on calcium boosters, good, that saves me doing it.'

Then there were a set of tests which Silver did on an autoteach in the corner of the school office. While this was going on Pops was exercising in a centrifuge as the doctor had told him he must do extra too. When Silver finished the last test the school secretary messaged Pops; he said later that he was mighty glad to have an excuse to get out of the 'fuge. They went in to see the head teacher.

'Please sit down Mr. Tarr, Silver. I'm Mrs. Abaka,' she picked up a set of temporary printouts. 'Well Silver, you certainly know your maths and your galactography. Your English is better than average too,' she turned to Pops. 'Mr Tarr, which history syllabus did Silver follow?'

'Er, Silver?'

'I don't think I did history Pops.'

'Neither do I,' said Mrs. Abaka. 'Now what about music, art and sport?'

'Um, I know quite a lot about cricket.'

'Cricket?' Mrs. Abaka was surprised; cricket isn't a space game.

'Yes, I listen to cricket on audio when I'm doing other things; I listened to a bit of the third test from Beijing when we were waiting.'

'The third test from Beijing?' Mrs. Abaka sounded confused.

'Oh yes. Mo has already got five Australian wickets bowling slow left arm,' said Silver naming China's top player.

'Oh. I see,' the head teacher made a note and returned to her questions. 'Do you play any sports yourself?'

'Um, no Mrs. Abaka.'

'Or Music?'

Silver had had time to think about this, 'I can sort of play a sonor.'

'And art?'

'What, like painting?'

'Like painting.'

'I'm not very good at pictures Mrs. Abaka but I've painted lots of spaceships. Haven't I Pops?'

'I don't think Mrs. Abaka means that sort of painting Silver.'

Mrs. Abaka didn't mean that sort of painting.

Silver's life-support theory, hydroponics theory and space med were all satisfactory and when she checked Silver's suit rating Mrs Abaka looked astonished for a moment. Silver felt a little better.

In the end Mrs. Abaka allocated Silver a place in Mr. Darrenovitch's class. 'But we'll work out some catch-up lessons in History at least,' she said, 'and you must work hard at your stylus writing and diagram drawing.'

Silver said goodbye to Pops and was taken down to join the class. There were about a dozen people there, luckily Tam was one of them and he grinned when Mrs. Abaka announced: 'Mr. Darrenovitch, class, this is Silver Tarr-Bright who will be joining you from now on.' Among the murmurs of surprise was a derisive snort and Silver saw that Barry Pitt, was also in the class.

The class had already started studying the patterns of words in some poems. Silver found it easy and then there was a fun bit where they had to find new words and fit them into the same pattern.

Next there was a break which wasn't so nice because everybody crowded round and asked all sorts of questions. Barry Pitt and two of his friends asked rude questions and sniggered whatever Silver said in reply. Tam helped a bit but Silver was glad to get back to class where they did some acceleration problems. All in all Silver's first not-quite-half day at school wasn't too bad at all.

#

Vangi sought out Mrs. Sturgis at first break. It was lucky she did. 'Today is the day I have to send in the names of all the candidates for the Crew Ticket test,' explained Mrs. Sturgis. 'If you want to do it I think you would be likely to pass but I can only take you if you get one of your parents to complete a form and get it to me before the end of lunch break.'

So at lunchtime Vangi found a workstation and transmitted the form to her father at work then explained the urgency by Vid. He filled the form and attached his electronic signature, Vangi forwarded it to Mrs. Sturgis just in time.

#

Henry was also busy. He looked up the maths he would need to study for his Pilot's Licence. He found he couldn't do it at school but they did have a set of autoteach classes he could study. He requested a copy. One glance at it told him he would need help. 'I hope my Dad and the Uncles meant it when they said they'd coach me,' he muttered.

At the end of school they met in the Refec to compare notes. Now it was all arranged Henry and Vangi told the others the news.

Silver grinned madly. Probably the relief at having survived the day was having an effect.

'Yay!' cried Tam, twisting off his sticky and leaping gleefully. 'So next weekend we can have a real adventure.'

'Not yet,' Vangi snagged his belt and pulled him back to his pad. 'We've got to take the exams first. It'll be July at least, probably August before we can go without grown-ups.'

'Oh,' said Tam, deflated.

'Besides,' said Silver. 'I've been reading about adventures. Four children is right and a ship but we ought to have a dog too.'

'Twm's got a dog,' Vangi wasn't prepared for the reaction.

'Who?' demanded Henry, looking around the Refec in astonishment.

'Here?' Silver grabbed Vangi's data strap and used the hold to hover right in front of her face.

'Down the well,' said Tam. 'Useless.' He batted a waving knee so that Silver, still holding on, went over Vangi's head dragging her off her sticky in the process. They miggged back. The Refec is spun at six percent G to hold the drinks in the mugs so you can't mig far.

The supervisor was watching them, Henry shot Tam what he hoped was a withering glare and hissed: 'Don't get us banned! You too Silver.'

'Down the well,' admitted Vangi. 'Twm's my v-pal. All my class had to have an v-pal this year, you can vid him if you like Silver and ask him.'

'Oh right,' said Henry. 'We had to do that too. It was ghastly, after about three vids we couldn't think of anything to say.'

'It is hard doing ones for class,' admitted Vangi. 'But Twm's not so bad.' She activated her data strap. 'Loc Twm.' It pipped. 'To Silver, transmit.' It pipped again and so did Silver's. 'There,' she said, 'you can ask him now.'

Silver looked at the displayed loc, filed it and grinned again, 'Will do.'

Silver looked around. 'Hey, I know Bex goes to school, where is she?'

'The little ones get out first and there's a special dustibus for them, they go straight home,' said Vangi. 'Then the primaries like Bex and they have a special bus too. They left about half an hour ago.'

'Then we get a break until the dustibus gets back,' Tam took up the story. 'Lots take the dustibus, especially the ones in multidoms.'

'But we generally stay here a bit longer,' said Vangi. 'Usually we stay until shift-change when loads of grown-ups turn up and spoil it.'

'Because we don't live in multi's it's quicker to EVA,' added Tam.

'Which gives us time for more important things,' said Henry. 'Does anyone else want a cherry ginger cake?'

Chapter 8

250,000,000 miles away.

Twm staggered into his room and heaved the bag onto his bed. Jess wuffed, went straight to her basket and rummaged furiously as if making sure everything was in it's place. Evidently it was for she flopped down and draped her nose over the edge as she always did. Twm carefully propped his fishing rod in the corner and began to unpack. Most of the bag's contents made a huge pile on the floor all of which smelled of dirty socks.

Jess wrinkled her nose.

Twm found the heavy bundle he was looking for. He unwrapped the fossil trilobites he had collected from the gully between his uncle's farm and the beach. Now, where to put them?

For now the windowsill would do - he would have to make a space for them tomorrow, maybe on the shelf above his workstation. He looked at it. The shelf was full of half-term assignments that he would have to look at tomorrow as well. The mail light was blinking. 'Screen On.' There was bound to be lots, he'd been away for a week and he'd wrecked his data-brace rock-pooling on the second day.

The screen lit up showing loads of messages from Hari, several reminders from school, a 3d-card from Jan and, wait a minute, who's was that strange face? He stared at it until it highlighted and, 'Open'

'Hi Twm, I'm Silver.'

began the vid.

'You don't know me but Vangi Tarr gave me your loc 'cos I wanted to ask you some questions about your dog.'

He looked at Jess, she looked back, not actually asleep.

'I mean, she said you had one and we don't have them here.'

'Stop. Reset. Author data.'

'Author Silver Tarr-Bright. Silver.TB@orbitalnine.net.belt Dom withheld. Timezone UTC zero, orbital...'

and it went on to give a date that was nearly a week old.

'Wow Jess, we've got a new belter to talk to. Come and say hello,' Twm patted the seat beside him, hugged Jess as she jumped up and ordered: 'Recordback. Play.'

'Hi Twm, I'm silver.'

'Hi Silver.'

'You don't know me but Vangi Tarr gave me your loc 'cos I wanted to ask you some questions about your dog. I mean, she said you had one and we don't have them here.'

'This is Jess.'

'Wuff'

'Are dogs very big? I've seen pictures of them and they seem to be all sizes. Do they keep on growing and growing and are the big ones very old?'

'There are different types, Jess is a...'

'Wuff,' Jess licked his ear.

'Gerroff Jess'

'Growlf'

'Does your dog sleep on your bed 'cos in my book it says they sometimes do?'

'...is a labrador. No each type only grows so big...'

'And what do they mean about playing 'fetch', surely dogs can't carry things in their feet?'

'No she has her own bed but some do. Er I think I'll have to make a vid to show you... '

'Does your dog do everything you tell him to?'

'...but that will have to be tomorrow. What Jess?'

'Wuff,' Jess slurped again.

'Gerroff Jess'

'Growlf'

'well, sometimes...'

#

'...well, sometimes'

Twm's voice stilled as Silver froze the frame.

'Look at that!' said Silver, pointing at Jess who had chosen that moment to yawn. 'Jess'

mouth is enormous and you've seen her tongue. Now look.'

The vid skipped forward to a picture of Twm and Jess in a grassy place. 'I think he stuck the cam to a wall,' said Silver. 'Watch.' Twm threw a ball high and hard. Jess tore off in pursuit. The ball descended. Jess leapt in the air and caught it in her mouth. Silver froze the frame again.

'Is that dog smart?' demanded Silver. 'Did you see her figure a one G ballistic and then take off and intercept? That's real good piloting.'

Silver spooled back and slo-mo'd the catch. 'I mean I knew people could do that sort of thing because of cricket but that's nowhere near a tangent.' Silver spooled back again and highlighted the ball and Jess's nose. 'Track marks,' ordered Silver and played the clip over, now Jess's nose and the ball left trails. 'Look it's nearly a hundred and five degrees.' The marker trails met and Silver displayed the angle. 'Can you imagine figuring that?'

'Um, yes,' said Henry who had spent the last class calculating short path elliptical transfer orbits, 'but I'd need a little more time.'

They were in the Refec once more. Silver had survived a week and a half of school. Vangi had been to two of the after-school Crew Ticket classes and already she had nearly caught up with the rest of the group.

Henry was still no farther on with his maths. The rest was OK, though, it was more of the stuff he was already doing and Mrs. Sturgis would point out the extras he'd need when she went through his class work and he was able to cover it. The Space Law was proving tougher than he had expected though. He'd decided to ask Uncle Grin to go though some of it at the weekend.

Silver hadn't finished, or rather Twm had recorded more and Silver went on to play it:

'Do you fly a space ship, Vangi said she didn't?'

Twm was recording without Jess this time.

'I sometimes sail a boat but I'm not allowed to go far without a grown-up until I pass a test. There are classes at the sailing club.'

Twm displayed a still picture of a tiny boat with white cloth sails on a huge expanse of water. He continued talking while moving an orange pointer around the picture.

'This is me steering,'

The pointer moved.

'my pal Hari handling the sheets.'

And again,

my Uncle is the passenger.'

'He's a bit out of date,' said Silver. 'Have you Told him Vangi?'

'No,' said Vangi.

Twm continued to talk over another picture that showed the same boat pulled up on the shore.

'This is Feckless. She belongs to my Uncle but he says he'll give her to me as soon as I pass my Day-Skipper exam. I can't even start to do that until I get my Competent Crew Certificate so it won't be until next year even if I hurry.'

'Hey, why didn't you tell me about this?' asked Henry. 'It's the same as here.'

'Boats are great but I'd love to go in a space ship one day, you're so lucky.'

'I didn't know,' said Vangi, 'All the vids we did for school were ghastly boring ones about school. You sort of have to do it like that because the teachers see them.'

'How does that thing go? Where's the Motor?' asked Tam as Twm came back on the screen.

'I have to learn all sorts of maths and rules and things to get the ticket. Do you have to do that to drive a space ship? Or can you go straight there 'cos I suppose you can nearly always see where you're going?'

Henry and Vangi both spluttered. Silver stopped the playback and looked at them.

'That is so wrong,' began Henry.

'I know,' interrupted Silver. 'But I couldn't think how to explain it.'

'But how does that thing go?' repeated Tam.

'Woa,' ordered Vangi, and paused, slightly surprised, when they all did stop and looked at her. 'Ah,' she recovered. 'Why don't we grab a vid-booth and reback?'

#

Which is why Twm found an unexpected vid in his inbox the next morning. 'Recordback,'

he ordered.

He knew Vangi and Silver as soon as he saw them but there were two boys with them who he didn't recognise, one older and one younger. They were in a sort of booth. He could catch glimpses of a big room behind and people moved around with a strange sliding motion. The vid opened with a slight scuffle as everyone tried to talk at once then Vangi took charge.

'Shut up you lot, let me do this.'

'But Vangi...'

'You too Tam.'

The smaller boy subsided.

Hi Twm, we all saw your vid to Silver and we've all got things we want to say so, ah, here we are. This is my cousin Henry.'

'See you Vangi, Silver,' Jess jumped up to see who he was talking to.

'Hi Twm,' said Henry.

'Hi Henry.'

'and this is my brother Tam,' continued Vangi.

'Hi Tam.'

'Hey Twm, is Twm like Tam, you know, short?' asked Tam.

'Resume playback'

'I think so, yes.'

Twm saw himself and Jess appear in a sub-pane.

'Wuff'

'Does your dog do everything you tell him to?'

'...but that will have to be tomorrow. What Jess?'

'Wuff'

'Wuff'

'Gerroff Jess'

'Growlf'

'Wuff'

'well, sometimes...'

'Pause playback'

The sub-pane froze with Jess yawning.

Jess whimpered.

'Are all dogs' mouths that big?' asked Silver.

'Does Jess ever bite you?' asked Tam. 'I see she licks you she must think you taste all right. I mean,' Tam waved his arms and nearly hit Vangi who shoved his hand away.

'Big dogs have big mouths and little dogs have little mouths if that's what you mean. Jess wouldn't bite me. I don't know what I taste like Jess licks lots of things.'

'Wuff,' Jess licked his ear as if she was trying to prove him right.

'Gerroff Jess'

'Growlf'

'Skip to mark'

'Do you fly a space ship, Vangi said she didn't?'

'Ah, that's changed,' said Vangi.

'I sometimes sail a boat but I'm not allowed to go without a grown-up until I pass a test. There are classes at the sailing club.'

'You mean you do?'

'Stop it there Vangi,' said Henry.

'This is me steering,'

'Pause playback'

'What Vangi means,' said Henry. 'Is that I'm learning to fly a ship and she...'

'Let me tell him,' interrupted Vangi.

'Oh, OK.'

'I'm taking the Space-Crew Ticket,' said Vangi. 'So I will qualify to do any general duties and if I pass an extra test I'll be able to fly dusties. Henry is: tell him Henry.'

'I'm taking the Private Pilot's Test. If I pass I'll have a restricted, provisional, licence that I can't use except with a competent crew...'

'That means me,' interjected Vangi.

'That means Vangi,' agreed Henry, 'Until I've commanded a competent crew for 100 hours and held the licence for at least a year.'

'My Dads are going to lend Henry our Space Tug so he can practice,' said Silver.

'So we can have an adventure and go anywhere we want to,' crowed Tam.

'Boating certificates are a bit like that.'

'Well, not anywhere,' said Henry, 'I'll have a limited licence at first. I won't be allowed to go more than five thousand miles from base.'

'What? Could you come here?'

'Resume playback'

'Oh, that's a shame. With boat tickets you go up in steps and each one is a bit harder. I have to do the...'

'my pal Hari handling the sheets and my Uncle is the passenger.'

'...Competent Crew Certificate first and then the...'

'How does that thing go?' asked Tam, 'What sort of Motor has it got?'

'...Day Skipper, and after that there are...'

'This is Feckless. She belongs to my Uncle but he says he'll give her to me as soon as I pass my Day-Skipper exam. I can't even start to do that until I get my Competent Crew Certificate so it won't be until next year even if I hurry.'

'You mean you'll have a whole ship all your own? You are lucky,' Silver was obviously impressed.

'...more complicated ones. Oh, I already told you. It doesn't have a motor, the wind pushes it by vectors.'

'Boats are great but I'd love to go in a space ship one day, you're so lucky.'

'I didn't know you did boats, you never said,' said Vangi. 'That looks really nice but it's small, where do you sleep?'

'Well she's only a dinghy.'

'I have to learn all sorts of maths and rules and things to get the ticket. Do you have to do that to drive a space ship? Or '

'Stop it here Vangi.'

'Er, sorry. Feckless, isn't the sort you sleep in...'

'can you go straight there 'cos I suppose you can nearly always see where you're going?'

'Pause playback'

'...mostly we go fishing.'

'Spaceships always go in orbits, curves,' said Henry. 'You have to work out the curve that goes from the curve you are already going in to the curve the place you want to get to is going in and arrives at the same time as the place you are going to gets there.'

Vangi joined in. 'And then you work out how much delta you need to get from each curve into the next one.'

'And exactly when you have to go,' finished Henry.

'Pause Playback'

Jess jumped down and went back to her basket.

'That sounds complicated. With boats we do triangles. The places we go don't usually move 'cos usually we go to another place on land or to a wreck or a reef that's on the bottom of the sea and doesn't move but...' Twm started pointing and moved his hands sideways. 'There's always a current because of the tide and that keeps changing and you have to look it up so that moves the boat one way. The wind blows the boat another way and then you have to work out where those movements would take you and steer a course from the place the boat would have gone to the place you want to go,' Twm took a breath. 'If you're sailing sometimes the wind won't let you go that way so you have to work out some tacks, a sort of zigzag. Pause recording. Hide command.'

Twm called up his course notes and selected a navigation diagram, he attached it to the vid.

'Resume recording.'

'Here is a diagram that shows you how it works. I've got lots more if you like.'

'Resume playback.'

'There was a bit in the vid you sent me,' Silver was talking now, 'Look I've put marks on.'

Twm watched the clip where Jess caught a high bouncing ball in mid-air but now there were lines trailing from Jess's nose and the ball, Silver continued to talk over the action.

'Jess did a one G ballistic intercept at a hundred and four point two degrees and she did it so quickly. How did she figure it so fast? Can she do other maths like that?'

The clip ended.

'How can Jess breathe with that big ball in her mouth?'

'Er, I've never measured it like that. I don't know, she just does.'

On the screen there was a commotion in the big room behind and Henry looked back. Twm continued. 'I don't think she does sums, I wonder who I could ask.'

'Shift Change,' Henry was speaking to the others.

'The ball doesn't block her nose and anyway she can breathe round the sides of her mouth too.'

'Sorry Twm, We've got to go now,' Vangi said. 'Vid you later. Bye.'

'Bye.'

'Bye Twm'

'Goodbye Twm, goodbye Jess.'

'Oh, Goodbye. Er, why don't we do this on a live link instead of rebacking,' Twm did a seek but neither Vangi nor Silver's servers responded. 'Hey, I'll be on this evening when I get back from school 'til about nine o'clock, er, that's Universal Time plus one. Er, end recording. Hide command. Send.'