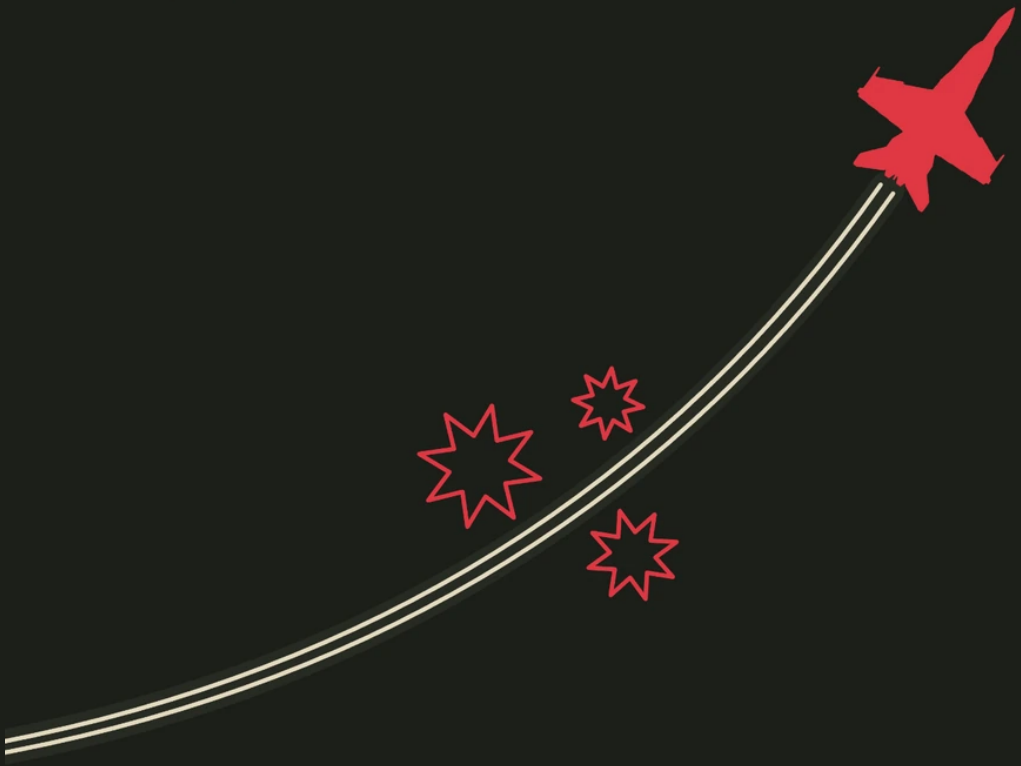
STAYING AHEAD OF THE JET

A Fighter Pilot's Guide to Better Decisions



PAUL LITTLEJOHN

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Paul Littlejohn

FREE ADVANCE EXTRACT

Introduction and Chapters 1–2

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Introduction: Energising the Ball

It is the only runway I have ever flown to that gets smaller the closer I get.

It is 3 December 2007, a calm day with light cloud out over the Atlantic, and somewhere below me is the USS *Dwight D. Eisenhower*. I am a Royal Air Force pilot on exchange with the United States Marine Corps, strapped into an F/A-18 Hornet, the U.S. Navy's frontline multirole combat aircraft. In a few minutes I am going to land on a ship for the first time in my life.

Nobody tells you how small a carrier looks. Stand on its deck and it is a steel town: nearly five thousand people, a flight deck a third of a kilometre long, jets parked wingtip to wingtip along its edges, and the island, the ship's tower, rising from the right-hand side.[1] From up here it looks like a toy boat on the ocean, trailing a long white wake. The part I have to land on is smaller still: a strip painted at an angle across the back half of the deck, slanting away to the left, with four steel cables stretched across it near the stern. The hook under the tail of my jet has to catch one of those four cables to stop me. The Navy expects me to catch the third.

The sky above the ship is busy. Jets circle overhead in the stack, the holding pattern where they wait their turn at different heights. The radio is full of formations checking in, and one by one the jets peel off, swing round behind the ship and drop onto that deck. We are here to qualify. Each of us has to make a set number of landings to the Navy's standard.

For a naval aviator this is the job. A pilot who cannot reliably land back on the ship is not combat effective. Every landing is graded, with the grades posted in the squadron for all to see. American pilots make their first carrier landings in training, in the T-45 training jet, so for them today would be a second qualification. In the Royal Air Force, my runways were a couple of kilometres long and landing was admin. The language, the procedures and the culture of naval aviation are all new to me. I have spent weeks flying approaches to a runway ashore with the outline of a deck painted on it, every approach analysed and assessed by the squadron's Landing Signal Officers, the LSOs. None of it feels like enough now. I am more than a little terrified.

I roll out of the final turn behind the ship, lined up with the angled deck, and my world starts to narrow, from the ship to the deck, from the deck to the back of the boat, and from there to a single amber light.

That light is known as the 'ball'. On the left of the landing area a lens shines the ball out towards me between two rows of green lights, and where it sits tells me where I am on the glide path that will put my hook into the wires. Level with the green lights, I am on it. Above them, I am high. Below them, I am low, and if it turns red, I am dangerously low.

I call it on the radio: my side number, "Hornet, ball", and my fuel. A calm voice comes straight back. "Roger ball."

That voice belongs to the LSO, known to every naval aviator as Paddles. LSOs are carrier pilots themselves, trained on top of their own flying to bring other pilots aboard. They stand on a small platform on the left edge of the deck, a few metres from where the jets touch down, and they watch every aircraft all the way in. From

there they can see what I cannot see from the cockpit: whether I am settling, drifting off the centreline or arriving too fast. They talk me down with a few quiet words, and in one hand they hold the pickle, the switch that sets the wave-off lights flashing red and sends me round again if the approach is not safe. Afterwards they grade every pass. For the next eighteen seconds or so, the ball and that voice are my whole world.

You might think the aim is to pin the ball in the middle and hold it there. Naval aviators are taught something different. A ball sitting dead centre tells me where I am, not where I am going, and nothing out here stays still. The deck is steaming away from me, the wind over it shifts from one second to the next, and the jet is sinking towards the ship the whole way down. By the time a sleeping ball starts to move, I am already behind it.

So, I keep the ball energised. My left hand never stops, walking the two throttles forwards and backwards one at a time, because moving them together is too coarse. A touch of power and the ball rises; before it can climb too far, I ease off and catch it, so it never drops through the centre. I am trying to keep it alive just above the middle, under constant small control, so that I always know where it is going next. Naval aviators call this ‘flying the ball’, and you fly it all the way to touchdown.

Just above the middle, because the two ways of getting it wrong are not equal. Too low, and the jet can hit the back of the ship. Too high, and the hook skips over the wires, the jet runs off the end of the angled deck and I go round again: a bolter and some embarrassment in the debriefing room. You keep the mistake you are most likely to make on the side you can survive.

I wiggle my fingers and my toes to stay loose. “Power,” says the LSO quietly, and I give it a touch. The deck fills the windscreen. I hold the attitude, fly the ball and do not look at the wires.

The wheels slam onto the deck and I push the throttles to full afterburner, exactly as trained, because if the hook misses the wires, the jet has to be flying again before it runs out of deck. For an instant there is nothing to do but trust that I have done it correctly and hope I have caught a wire.

The hook catches. The jet stops from approach speed in about two seconds and the straps bite into my shoulders. Only then do I bring the throttles back. I’m aboard. For a moment there’s just the joy of it. Then I have to find a yellow jersey.

At an airfield I’d make my own way to my parking spot. Out here the aircraft director is in charge. I pick out the yellow jersey in the crowd and follow the signals until I’m handed on to the next director. My eyes go back into the crowd. Which yellow jersey is mine now? I’ve never had so much to do just to get parked.

That was my only landing that day. I stayed on the ship that night. The next day I flew twice, and each sortie began with a catapult launch off the front of the ship: two landings on the first, three on the second. On the third day I made four more by day and four at night, and then the catapult threw me off the ship one last time and I flew back to Naval Air Station Oceana in Virginia. Fourteen landings on the ship in three days.

After each recovery, the LSOs came down to the ready room and debriefed every pass, in a shorthand of their own that splits the approach into the start, the middle, in close, and at the ramp, the back edge of the deck. I remember the debrief of my first: *“Little high in the middle, came down through the glideslope, low in*

close, power at the ramp. Fair pass." I had chased the ball all the way down: a little high, then down through the glide path until I was low, then added power at the last moment. Fair is a middling grade, given for a safe pass with errors in it that were corrected. It was wobbly, but graded, and I was aboard.

* * *

For those eighteen seconds, being ahead of the jet meant seeing where the ball was going while I still had time to do something about it. On my first landing I'd spent much of the approach catching up.

I flew fast jets for sixteen years. In the Jaguar, a single-seat jet the RAF used to attack targets on the ground and to conduct reconnaissance, low and fast, I flew operations over northern Iraq. I qualified as a weapons instructor on the Jaguar. The RAF course served much the same purpose as the US Navy's TOPGUN. We went back to our squadrons to teach other pilots. On exchange with the Marines, I taught their pilots to fly the F/A-18 and became a carrier-qualified naval aviator. All of it felt routine to me at the time, but there was nothing ordinary about it.

That world moved inexorably forward. Down at low level, at nearly 900 kilometres an hour, I had to see the world on a much larger scale. Most people find their way by roads and street signs. I found mine by whole towns, coastlines and mountain ranges, with my attention far out ahead of the nose, because there was no stopping to take a second look.

It held risk at every turn: in hills with their tops hidden in low cloud, in jets bouncing through turbulence a few metres off my wing as their pilots fought to stay in formation, and in the deck waiting at the end of every approach to the ship.

It demanded excellence, and it checked whether I delivered it. Every pass at the ship was graded, every attack was judged against its numbers, and sortie after sortie ended in a debrief that took it apart, the successes as closely as the failures. Over northern Iraq, my jet was one of a package of 50 or so aircraft from several air forces. Everything had to be right first time, from plugging into the tanker, to putting the jet exactly where the cameras needed it over each target.

And it changed all the time, often without warning. A careful plan could change dramatically the moment a speck against the sky turned out to be an enemy fighter. A minute or two of hard turning could scatter a formation, and then each of us had to find the others again without slowing down. Weather closed in ahead of us, and we could no longer go on the way we had planned.

Through all of it there was an enemy. We trained for an enemy who would be trying to kill us, or, as I have come to put it since in the civilian world, trying to 'ruin our day'. The enemy watches what you do and changes its plans to defeat yours, so everything we prepared had to survive someone actively looking for its weakness.

The jet was a hard teacher. If I got behind it, it found me out in seconds. I was good at the job, and I struggled with it every day. The best pilots I flew with still got behind, but what marked them out was that they noticed early and did something about it.

On every flight I had to exercise my judgement again, often many times before I landed. When we sat down together afterwards, someone who had seen the same flight from another cockpit, or from the deck, could tell me what it had looked like from there. I

got to try again knowing something I could never have learnt just by getting home safely.

Nobody ever told me there were four things I had to do to keep my judgement sound, and you will not find them in a fighter pilot's training manual. At the time I was not consciously doing them. But once I had left the RAF, I noticed that I approached decisions differently from many of those around me, and that the difference was useful. I tried to explain how I worked, went back over how I had approached decisions, and found a consistent focus on the same four things. They are my own description of how sixteen years of flying made me think. In my experience, much of a fighter pilot's tradecraft does not transfer to business. What transfers is the judgement built in that world.

* * *

When I left the RAF, I joined PA Consulting, a management consultancy. A three-month project at Dubai International, the world's busiest international airport, led to a job with dnata, the Emirates Group's ground-handling company and the only ground handler at the airport. I had never worked in ground handling, yet within a few years I was running airside operations across all three terminals, the work passengers glimpse through the terminal windows: around 10,000 people getting each arriving aircraft unloaded, loaded and on its way again, hundreds of times a day. In 2016 alone, dnata handled more than 91 million passengers and nearly 98 million bags across Dubai's two airports.[2]

When I took over airside operations, the first thing waiting for me every morning was a set of emails from our largest airline customer. Some days there were half a dozen of them. Bags had arrived late. An aircraft had taken too long to turn round. Both

sides had explanations. We went to the people doing the work to find out which of them held up. I often suggested something that turned out to be impossible. Sometimes finding out why gave somebody a better idea. Sometimes all it gave us was an honest explanation to take back to the airline. Where the fault was ours, we worked to put it right. Within a year those morning emails had stopped. After two years the airline saw us as a partner it could trust. Four years in, we were working together on one of the airline's hardest problems. For a passenger standing at the baggage belt, what mattered was how long it took for their bag to come out. To find out where that time went we had to go back to the aircraft. We were measuring how long it took to open the hold and unload it, whether the drivers were there when the bags came off, and how long the drive to the baggage hall took.

Later I went into the holiday business. Tour operators sold the holidays. At Meeting Point our job was to look after their customers once they arrived. I was chief operating officer for the UAE and Oman and global head of operations for the group. I had never worked in tourism before. Now I work alongside owners and chief executives as an adviser. The people around me knew far more about the work than I did. I drew on what they knew, even when I came to a different decision. It took leaving the RAF to see how much of the way I did that I owed to flying.

When a morning started with half a dozen complaints, I could easily spend the rest of it trying to hold every detail in my head. The flying helped me sort out what I needed to understand for myself and what I could leave with the people who knew the work. Even after a bad shift, there were things we could do in time for the next one.

Being ahead meant I could still influence what happened next, towards something worth having, as things changed.

Being behind takes that away. In the jet it feels like everything is coming at you and you are not in control. You may know the feeling. It's half past four. You've been in meetings since nine and the one you're in now is running over. On the pad in front of you is the supplier's number you wrote down at lunchtime.

Your customer needs a spare part in the morning. As soon as the meeting ends, you ring. The part is there, on the shelf. The last van left ten minutes ago. At lunchtime you could have asked someone to put the part on it. Now, if you want to keep your promise, you'll have to find someone to drive it over.

Once a situation has left you with no good answers, being clever, energetic and brave will not give you back the choices you had earlier. There is a line often attributed to Frank Borman, the fighter pilot who commanded Apollo 8: *"A superior pilot uses his superior judgment to avoid situations which require the use of his superior skill."*[3]

Even with the van's departure time written beside the supplier's number, I'd still have had to decide that the call was worth leaving a meeting for. That's a judgement about which job can wait, and for how long. In the cockpit I had to make that sort of call every day.

Some former fighter pilots teach John Boyd's OODA loop in business. Boyd flew the F-86 Sabre for the US Air Force in Korea. Its bubble canopy gave the Sabre pilot a better view of the other aircraft than the other pilot had of him. One man could see where the other was now and decide afresh. The other might still be acting on his last glimpse of the Sabre. Boyd's four words were

observe, orient, decide and act. If you can get round that loop faster than your competitor, you have an advantage.[4]

I don't teach the loop in this book because the part I want to help with is the judgement you make each time round. What have I just seen? Does it warrant changing what I'm doing? I want to get good at making that call before I try to make it faster. You'll recognise Boyd's idea later when we come to deciding only as far as the next event. Sometimes I find out what I need to know by making a move and seeing what happens.

* * *

When I tried to explain what the flying had given me, I came back to four disciplines, each with a question. The discipline is the habit you practise. The question is how you bring it into a real decision.

- See the situation clearly. What do we actually know?
- Define what good looks like. What are we trying to achieve?
- Decide how far ahead to commit. What do we need to decide now?
- Commit with a tolerable worst case. If this goes badly, can we live with it?

I use them together, in whatever order the situation calls for. If I discover I was wrong about what was happening, I may have to reconsider how much I am prepared to commit.

Stated like that, it sounds obvious. Every decision already rests on all four: a picture of what is happening, some idea of what you are trying to achieve, a choice about how far ahead to commit and an assumption that you could live with the result if it went wrong. The real question is whether those four are examined or simply assumed.

The jet made me examine all four, flight after flight. Putting those habits into questions gives me a way to practise them on the ground. Take a piece of advice most of us have heard. If I tell myself to keep an open mind, how would I know whether I'd done it?

In 1984 Charles Lord and his colleagues gave Stanford students two accounts of research on the death penalty. One appeared to show that it deterred murder. The other appeared to show the opposite. Left to themselves, students tended to give the better marks to the study that agreed with them. A second group, asked to be impartial, did much the same. A third group was asked to consider how they would have rated exactly the same study if its results had come out the other way. Their judgements showed less bias.[5]

I knew nothing of that research when I was flying. Those students could use the question without even knowing the name of the bias. That's what I want the four disciplines to give you on Monday morning. Think back to that customer waiting for a spare part. Asking what you actually know about when the part can get there might change what you're willing to promise in the first place. You can think the decision through as a whole without having to remember which model goes with which part of it.

* * *

Good judgement can be trained. To use it in business I still had to learn the work, and much of what I learnt came from the people doing it. What I brought from flying was the habit of examining the picture, the purpose, the commitment and the downside. You can practise that on a decision of your own, whether it concerns your work, your career or someone you love.

Years in the cockpit changed my relationship with certainty more than anything else. I live knowing that my picture of the world has gaps in it and that any part of it can become wrong in seconds, yet I speak clearly, have firm opinions and make decisions. It is easy to treat confidence and uncertainty as opposites, so that the only choices seem to be waiting for a certainty that never arrives, or manufacturing one so that it feels safe to act. I learned to do neither. My confidence rests on knowing what my picture is built on, what I am trying to achieve, how far I need to commit, and what I could live with if I turn out to be wrong.

Other people, events and luck still decide a great deal. The reason I practise these habits is that they help me see a choice while I still have time to make it. That is what I want for you.

I once got behind on a crowded airfield in Hungary, after an airshow. It began with one of the most ordinary radio calls a pilot makes. At the time I barely thought of it as a decision.

1 Kecskemét: Getting Behind the Jet

It is August 2003, the international airshow at Kecskemét is over, and every pilot on the airfield wants to go home at the same time.

Dozens of jets are lined up, and the radio is a continuous stream of pilots asking for permission to start their engines and taxi. I have never left an airshow before, and I have never seen anything like this.

Kecskemét is a Hungarian air force base on the flat plain about 85 kilometres south-east of Budapest, and the home of Hungary's MiG-29 fighters. Hungary joined NATO in 1999, one of the first countries of the old Warsaw Pact to do so, and the alliance is busy building ties with the air forces of its former opponents.[1] The RAF's Jaguar force does much of that work, on exercises and at events like this one in Poland, Hungary and Romania. For two days I have stood in front of my jet doing what pilots do at airshows: explaining the aircraft to visitors, answering their questions and posing for photographs with them.

My jet is a Jaguar, a single-seat, twin-engined ground-attack aircraft that Britain and France designed together in the 1960s and the RAF has flown since the 1970s.[2] Home is RAF Coltishall in Norfolk, the Jaguar force's base, almost 1,500 kilometres away, and I have a flight plan filed to get me there in one leg, leaving at the time I organised. I want to keep to it.

If I leave late, the plan has to change, and changing it means more calls to air traffic control on a frequency that is already full. It probably would not be a big deal, but I have never done this before,

and in a single-seat jet, every radio call, every calculation and every change of plan is mine to make alone. I let it feel much bigger than it is. The ground team are standing by the jet, ready to see me off, and I feel awkward keeping them waiting.

So, I call air traffic control and ask for permission to start. They approve it, and I start the engines. I expect the queue to move quickly, and starting now feels like getting ahead of it.

It does not move quickly. Permission to start has told me nothing about when I will be allowed to leave. I have joined a queue without knowing how long it is, and starting my engines has not moved me up an inch! I am exactly where I was before, except that now I am burning the fuel I need to reach home.

I watch the fuel gauge and do the sums, and the margin I need for the flight home is quietly evaporating. Nobody is shouting. No warning lights come on. But there is a slowly tightening situation that I have caused myself and have not yet admitted.

Two ways out run through my mind as I sit there. I could shut down and stop burning fuel. The ground team have gone, though, and I need their help to restart. I would have to wait for them to come back. Or I could plan a fuel stop in Germany, which means working out a new route here in the cockpit, arranging it over the radio on my own, and adding about half a day to the journey. I have set out to get home in one flight. From this cockpit, both ways out look like failure. So, I keep rejecting them, and every minute I spend doing so burns more fuel and makes the next choice a little harder.

When I call air traffic control again, I ask for an expedited departure. They offer me a way out of the queue: an immediate take-off from the other runway, with the wind behind me.

The Jaguar is short of power. The running joke on the Jaguar force is that if one engine fails, the other is there to fly you to the crash site. And a tailwind makes any take-off longer. With the wind behind me, the jet has to run faster along the runway before there is enough air over its wings to lift it, and a tailwind of a tenth of the take-off speed adds about a fifth to the distance it needs. I work through the take-off performance figures, judge that I can make it, and accept.

I line up with the wind at my back and push both throttles forward into reheat, the RAF's word for afterburner, which gives the engines all the thrust they have. The jet starts to move, slowly. Then it ambles, gathering speed at a leisurely pace, while the far end of the runway comes into view and keeps coming closer.

I am watching for one number: my rotate speed, the speed at which I can raise the nose and fly. I worked it out from the performance figures for this weight and this tailwind, and it will appear in the head-up display, the glass screen in front of my face where the jet shows me my speed. It does not come. The runway is running out faster than the speed is building. The end of it is coming towards me, I still do not have the speed, and I am seriously considering ejecting: giving up the jet and letting my seat fire me out of the cockpit.

Then, one digit at a time, excruciatingly slowly, the number I need appears. I judge that it is enough, take it, and stay with the jet. I ease the stick back gently, because pulling harder would add drag to a jet that is already struggling to accelerate. The nose lifts. Ahead of me now are the boundary fence, the trees beyond it, and the terrifying thought that I have got this badly wrong.

The wheels leave the runway, and the fence is still coming towards me. I am not sure I am going to clear it. Then it is gone beneath me. I have no idea by how much, only that I have not hit it. I ease the nose up and do not look back.

One problem down. Now I need to get home on the fuel I have left. I climb as high as I can, because the Jaguar goes further on each kilogram of fuel at height. Every flight plan carries a contingency, fuel for the unexpected on top of what the trip should need, and beneath that the fuel to reach another airfield if home is closed. On the way home I use all of my contingency. I land at Coltishall with only the fuel I need for a diversion.

I still had the fuel to go somewhere else if Coltishall was closed. What I had used up was the extra fuel that gave me some choice if anything else went wrong along the way. Most of that trouble had started with the engines running and the wheels perfectly still.

* * *

It was a solo flight, so there was no debrief. What stayed with me was the fence. I knew I had started too early and I had no wish to repeat that take-off. It was only when I sat down to write this book that I worked back through the decisions between those two things.

The take-off was the frightening part, and the tailwind runway was a real decision, made with real figures. By the time I made it, though, I was managing consequences. The decision that set everything in motion was the radio call to start, and it was the one I had not thought through.

The ground team were waiting, and starting felt like progress. But I didn't look at what it could mean. At best, I would be able to leave

a little sooner. At worst, I would sit in a queue burning the fuel I needed to get home, which is exactly what happened. Almost nothing to gain, and my margin for the flight home to lose. I have a shorthand for decisions like this: no good can come of it. The right decision would have been to wait until I had a slot to depart, and only then ask for permission to start. A jet with its engines off burns no fuel. Waiting would have cost me a few extra radio calls and some awkwardness with the ground team.

The irony is that starting early was my attempt to get ahead. It is what put me behind the jet, and I was behind it before I had left the ground.

From there it snowballed. Once the engines were running, an uncertain wait had become a fuel problem. The fuel problem made the alternatives look worse and any way out of the queue look better. Each alternative I turned down because it felt like failure made the next one harder to take, and by the time air traffic control offered me the tailwind runway, it looked better than everything I had kept putting off. Each step in that chain made sense from where the step before had left me.

Each decision had left me in a different position from the one in which I made it. Had I been offered that runway while I was still parked with the engines off, I would never have taken it. By the time it was offered, I was the one on the radio asking for a way out of the queue.

* * *

Pilots learn what getting behind looks like in flying training. I learned to fly while I was at university, on the Bulldog, a small propeller trainer. Then came the Tucano, a turboprop, and then the Hawk, the RAF's jet trainer. A turning point a minute away in the Bulldog arrived in about thirty seconds in the Tucano, and in less than twenty in the Hawk. If I spent ten seconds finishing one job in the Hawk, half my time to the next one had gone. Then came the Jaguar, flown low at 480 knots, about a quarter of a kilometre every second. At each stage I had less time for the same work: flying the aircraft, knowing where I was, and keeping track of the other aircraft, the fuel and the time, all at once. The jet never waited while I caught up.

When a student fell behind, everything piled on top. The radio call to enter controlled airspace, where air traffic control has to clear you in, was not made, and the instructor took control before a rule was broken. Attention narrowed. A student fighting to catch up would miss an altitude they should have held or a threat they should have seen, and each miss made the next one more likely.

Being behind means that things reach you before you are ready for them. It feeds on itself, because catching up is work. While you deal with one problem, the next is already developing. More and more of your attention goes on correcting and recovering, and less on understanding what is happening and preparing for what comes next, until the situation is deciding for you.

Some students were 'chopped', our phrase for removed from the course. But many 'chopped' themselves. They recognised that they could not stay ahead of the jet and that flying it was no longer enjoyable, so they chose a different career path instead. Being

behind is an awful feeling, and in a fast jet it can kill you. Those of us who stayed learned to live ahead of the aircraft: to finish each job before the next one arrived, and to keep some attention free for what we could not predict.

* * *

Getting behind can start with something ordinary.

The meeting starts in twenty minutes and the map says the drive takes fifteen. There's time for one more email. Then we wait for the lift, walk to the car and queue at the barrier. By the first set of traffic lights we're thinking about the clock instead of the meeting. We still have to find a parking space at the other end and walk to reception. We arrive late, apologise and spend our first ten minutes catching up. If the meeting doesn't matter much, that may be a fair price. If it does, it's worth asking what we thought those fifteen minutes bought us. The map only gave us the drive.

Some workplaces are like that morning every day, and you may have worked in one. Each day goes on solving yesterday's problems, so nobody prepares for tomorrow's, and the same problems come round again the following week, month or year. Everyone inside can see it happening, and plenty of them are frustrated by it, but today's problems always come first, so nothing changes.

In the 1990s Leslie Perlow spent nine months with a team writing software for a new colour laser printer. One engineer's log gives a feel for his day. At ten past eight he sat down to work. At twenty past he broke off to warn two colleagues they were working on the wrong code. They needed to know. It was half past eight before he got back to his own work. The team tried setting aside three mornings a week when everyone could work without interruption.

The printer launched on time, only the second on-time launch in the division's history. Six months after the launch, Perlow found little of the change had lasted. On a later visit she learnt that the next product was running behind schedule. The engineers could see the benefit of quiet time, but people still got credit for coming to the rescue.[3]

Those engineers were already busy. By agreeing when they would leave each other alone, they made room for work that otherwise had to wait until it was urgent. That is the kind of spare capacity I look for. If every hour is already spoken for, where will the work of preparing for tomorrow fit? A diary of back-to-back meetings, week after week, can be one sign of it. At Kecskemét, my spare capacity was fuel, and I spent it sitting in a queue before I had flown a metre. The fuel was only the part I could read on a gauge. What I was really spending was my options.

Being behind rarely announces itself, so it helps to know the signs. At Kecskemét, I could see my margin shrinking as I waited, and the ways out all looked like failure, so I kept turning them down. I saw both and could not admit to myself that I was behind.

When the way out starts to look embarrassing, ask what waiting will cost you. In that queue I was willing to burn fuel to spare myself a few awkward minutes with the ground crew.

Staying ahead means keeping enough room to influence what happens next as things change. On that runway I was still making decisions. I was also choosing among the very few options my earlier decisions had left me.

By the time I realised what starting those engines had cost me, the fuel I had burnt was gone. I could still shut down and keep what was left for the flight home. Waiting for the ground team to come

back would have been frustrating. But every minute I spent hoping the queue would move was costing me fuel as well as time.

When you are already behind, what can you still save? Think of that morning when you are going to be late for a meeting. Before you leave home, you remember that the people there need the figures you are bringing. If you send the figures ahead and ask a colleague to start, you can still give the meeting what it needs. You will have lost some of your own time. You can still save theirs.

In the air the spare capacity I needed was time, attention, fuel, height and options, and most of it was made on the ground. Before every sortie we worked through the purpose of the mission, the target, the threats, the route and the constraints, and decided what we would do if the things most likely to go wrong did go wrong. Nobody in the briefing pretended to know how the sortie would unfold. The point was that nobody would be working out the purpose of the mission, or thinking about consequences for the first time, at the same time that a fast decision was needed.

Done well, this looks like foresight. Nobody can know the future, and yet a pilot who has done that work often sees what is coming, because they understand the situation, the aim, and the risks well enough to recognise what is developing while it is still small. That early recognition is the whole advantage. It turns what would have been a surprise into something they were ready for.

None of this is an argument for caution. Staying ahead can sound cautious: keeping options open, avoiding commitment, waiting for things to become clear. In the jet it worked the other way. Preparation, understanding and a clear purpose were what let me commit quickly and fully when commitment was needed. Options kept open for their own sake are another way of standing still.

I am certain of this for a simple reason: the only way any of us changes anything is by doing something. Thinking, planning, analysing and worrying can all help, but none of them change anything on their own.

The duty to act was drilled into me as an officer, from initial officer training at the RAF College at Cranwell, in Lincolnshire, onwards. Our job was to take the initiative and drive things forward, and the standard was very clear. An officer who tried something sensible and was wrong could be forgiven. One who failed to act was judged much more harshly. I regard this as one of the fundamental principles of military leadership, and it is right. The military sets the expectation in advance, because doing nothing seldom looks like a failure until it is too late.

Sometimes an officer ought to wait. It still takes a decision. What will waiting cost, what might it allow, and what would make you move?

From the outside, a person who has chosen to wait looks much like one who hasn't yet made up their mind. Ask what they're waiting for and the difference soon becomes clear.

However, the duty to act can also be a trap. Doing something feels better than waiting, and that pull is real even when acting is wrong. You can put yourself behind by moving too soon, just as surely as by moving too late.

At Kecskemét, I was wrong both ways. Sitting on the ground with the engines off until I had a slot to depart would have been the right kind of waiting: chosen, for a reason, with a clear signal to move. Instead, I acted when I should have waited. Then, once the engines were running, I drifted, turning down each way out because it felt like failure.

That day I assumed the queue was about to move. In fact, I had no idea how long it was, and starting my engines did nothing to shorten my wait. I could have asked when I could leave. What I asked for was permission to start the engines. Everything that followed, the fuel, the tailwind runway and the fence, came from it.

2 Banak: Your Picture Is Not Reality

It is 3 December 2003, four years to the day before my first landing on a carrier. Somewhere over the north of Norway, two F-16 fighters of the Royal Norwegian Air Force are trying to stop me.

I am leading a pair of RAF Jaguars, my own jet and my wingman's, on a training mission. Our job is to reach a target. Theirs is to stop us. We know that two F-16s have taken off, and we have seen one. The other is out there somewhere, and until we know where he is, the gap in our picture shapes everything we do: where we look, how we cover each other and what we are ready for. We fly the rest of the mission expecting him.

We never find him. Afterwards we debrief by phone with the Norwegian pilots. Our account has a hole in it where the second F-16 ought to be. Their wingman can fill it. He had lost sight of his leader and stayed out of the fight while he tried to find him again. From his cockpit he knew why we had seen only one aircraft. From mine all I had known was that two had taken off.

My squadron, 41 Squadron, flies the Jaguar on reconnaissance and attack from RAF Coltishall, and each year the squadron comes up here to Bardufoss, a Norwegian air base well inside the Arctic Circle, for two weeks of training in the conditions it would have to fight in. In the Cold War, the plan was that if war arrived, 41 Squadron's Jaguars would deploy to Bardufoss to help defend

NATO's northern flank,[1] and the far north of Norway is still somewhere we could be sent. So, we train here as we would fight here. The temperature can fall to minus forty. We sometimes land on snow, we fly low along fjords with cables strung across them, and we drop live bombs on the ranges. Before every flight I pull on thermal underwear, a woollen all-in-one we call a bunny suit, my flight suit, cold-weather trousers and jacket, and an immersion suit over the top of the lot. For the walk out to the jet and back I add a big woolly hat and a pair of Dachstein mitts, thick Austrian mittens of boiled wool. Strapped into the cockpit, I look like the Michelin Man.

On our way home to Bardufoss, my wingman's jet develops a fault, and the two of us divert into Banak. Banak is the Norwegian air force's most northerly base, on a peninsula in the Porsangerfjord, at seventy degrees north.[2] At this time of year the sun does not rise here at all. There is a little light around the middle of the day, and then it is night again.

My wingman's jet is fixed on the ground, with help over the phone from our engineers at Bardufoss. Then I start mine, and it goes unserviceable too, with a fault nobody can fix from a distance. Engineers will have to fly out to it. I send my wingman home and settle in to wait.

I spend the day in the crew room with the crews of Banak's search-and-rescue helicopters, big Sea Kings that fly out over the Barents Sea, the Arctic water off the top of Norway and Russia. They tell me about the missions they train for: rescues so far out that there is no getting back. They would fly out to a Russian trawler in trouble, ditch a dinghy, rescue the crew and wait in the shipping lanes for a boat to pick everyone up. They also tell me something I will remember tonight. To the south of here is the

Kautokeino Plain, part of a vast plateau with the coldest winters in Norway.[3] If a pilot ejects over it, they say, they cannot reach him before he dies of exposure.

The engineers arrive by helicopter in the early afternoon, as the light is already going. They tell me they flew so low through the mountains, to keep the ground in sight, that cars on the roads flashed their headlights at them. The drivers had taken the helicopter for another car with its headlights on main beam. It is minus forty degrees. Snow blows sideways through the floodlights. The engineers can work on the jet for three or four minutes at a time before the cold drives them back into a minibus we have parked upwind of it, and I keep them going with tea from a big urn.

By the time the jet is ready, I have been on duty for more than twelve hours, which is longer than a pilot may work without rest unless someone agrees to extend it. I phone Bardufoss and get an extension to my crew duty hours. I feel fine.

I taxi out in the dark, and the head-up display starts to flicker.

The head-up display, or HUD, is a sheet of angled glass at eye level above the instrument panel. The jet's computer draws my flight information onto it in lines and numbers: a horizon line that shows which way up the aircraft is and where its nose is pointing, with my height, speed and heading around it. The symbols are focused so that they seem to float out on the world ahead, and I can read them and look through them at the same time. A fast jet is flown with the head up, looking out, and the HUD is what I fly by.

If it fails, the procedure is to switch it off and fly on the standby instruments: a small artificial horizon, an altimeter and an airspeed indicator, set low on the panel, separate from the systems that feed the HUD, and there for when everything else has failed.

Flying home on them means flying at night with my head down over the cluster of tiny dials scattered around a cockpit designed before user experience was even a concept, and is something I do not want to do.

The HUD steadies. It looks fine. I leave it on.

I take off into the black and go straight into cloud. There is nothing outside the canopy at all. In cloud my body is no help to me, and every pilot learns why, in the first lessons on instruments. Most of our sense of which is the right way up comes from our eyes. Take the horizon away and what is left is the balance organs of the inner ear, which feel a roll as it starts but can miss one that builds gently, and which before long, report a steady turn as straight and level flight.[4] So in cloud you believe the instruments, whatever your body tells you, and I believe mine. I fly the HUD: wings level, nose up, climbing towards home.

A few minutes in, the hairs come up on the back of my neck. The height on the HUD is climbing far too slowly for the climb I am flying. Then it stops climbing and starts to fall. The rest of the picture does not change. Wings level, nose up. I would expect to be gaining height. Why am I losing it?

I look down at the standbys. The little artificial horizon shows ninety degrees of left bank. The jet is on its side. The altimeter is winding down. I am at the edge of safety altitude, the height that keeps me clear of the highest ground around, and somewhere below me in the dark are the mountains of northern Norway. Below safety altitude, in an unusual position like this one, the rule is that I should eject. But out there in the dark is the Kautokeino Plain, and I think of what the rescue crews told me this afternoon. I am in no hurry to eject.

I look back up at the HUD. Wings level, nose up, a steady climb.

The HUD and the standbys are showing me two different aircraft. One of them is right, and the other one can kill me. My training says believe the standbys. Everything I decided on the taxiway says believe the HUD, and I want to believe the HUD. I cannot make the two agree, and while I try, I am moving the stick, flying the picture I want.

I look down again. Now the standbys show ninety degrees of right bank.

I have no idea what the aircraft is doing. Dread fills me as I struggle to make sense of two pictures that will not agree. What I decided on the taxiway is fighting everything I was trained to do. Adrenaline is pouring through my body. I am trying to fly the jet on the tiny dials, and I watch my life flash before my eyes. I am terrified, and I am furious with myself, because I knew the procedure and I did not follow it.

I look out of the canopy for anything at all. There is a break in the cloud. Out of the left side I catch a glimpse of sky. Out of the right I see a flash of mountain. I am in a steep right bank, exactly as the standbys say.

Now I believe them completely. I switch the HUD off, and the climb it has been showing me disappears. I keep my eyes on the standbys, fly the recovery I have practised for years and bring the jet back into a climb, away from the ground.

The whole thing probably lasted no more than ninety seconds but it felt like a lifetime. I climbed to cruising altitude on the standbys and flew home to Bardufoss. In my logbook that night I wrote “RTB Banak - UP Platform Fail !!”. RTB means return to base. UP

was my shorthand for unusual position, and Platform Fail named the failure behind the HUD. The two exclamation marks recorded what that flight had been like. It was not a good one.

* * *

That was the closest I came to dying in a jet. The engines were sound, and nobody was shooting at me. If I am honest, what nearly killed me was a display I trusted because I wanted to.

A HUD senses nothing for itself. It draws whatever the aircraft's systems tell it, and when the information behind it goes wrong, it draws the wrong picture as crisply as it ever drew the right one. Once mine had stopped flickering, nothing on it looked any different. In daylight the real horizon would have contradicted it at a glance. In cloud at night there was no horizon, and my body could not settle the argument. The only instruments in the cockpit that could tell me the truth were the standbys, which were separate from the systems that fed the HUD, and on the taxiway, I had decided that I did not want to use them.

Every movement of the stick made sense for the aircraft the HUD was showing me, but each movement was wrong for the aircraft I was actually flying. The picture was wrong, and trusting it over the instruments that contradicted it was part of my mistake.

Reality does not care what we think or feel about it. It simply is, and none of us ever sees all of it. Each of us has a picture, put together from what we have seen, been told, worked out and expected. The scholar Alfred Korzybski put it simply: "A map is not the territory."[5] In the cockpit, we had our picture, and we knew it was a poor copy.

Every decision you make is from that picture, so your judgement is no better than the picture it works from. That sounds obvious, yet after sixteen years in fast jets and the years in business since, I feel that the picture is the part of a decision that gets examined the least, because it does not feel like a choice; it simply feels like seeing. But getting that picture right is the discipline I call *seeing the situation clearly*, and the question to ask is "What do we actually know?"

In the 1990s researchers D. G. Jones and Mica Endsley examined aviation incident reports from pilots and air traffic controllers. Of the errors in situational awareness they identified, about three-quarters concerned what had got into the picture in the first place. Someone had missed or misread something, or the information they needed had never reached them. About a fifth concerned what the information meant. Only a few per cent concerned what was likely to happen next.[6]

At Banak the wrong display gave me the wrong picture, and I kept trusting it, despite the warnings and the instruments that disagreed. The information available and what I chose to rely on both mattered.

That is a warning, and it also gives us something to work on: what we let into the picture, what contradicts it, and what we check before we rely on it. All of us have a poorer view of reality than we think.

A picture will never be perfect. A good picture is the one most relevant to the task in front of you, with a sense of which part of it matters most right now. Nor is a picture ever finished, because a picture that was correct can be incorrect a few seconds later. Fighter pilots talk about gaining and maintaining situational

awareness, and the maintaining never ends. We keep building the picture, questioning it and updating it for as long as we are acting on it.

On every sortie I flew, I needed to know where I was against the airspace I was allowed to use, where the threats were, where they might be if I couldn't see them, what every aircraft in my formation was doing, how much fuel I had and what it let me do, and what was about to change. All at the same time with no fixed points. Nobody assumed that a clever, experienced pilot would simply have a good picture. The military built a whole system around it: how we briefed before a sortie, how we scanned the sky and the instruments, how we flew in formation so that each of us watched what the other could not see, and how we debriefed afterwards to find out what had really happened. We trained it, practised it and checked it every day, and it still broke down.

What that training gave me was the opposite of certainty: a permanent, working knowledge that I did not fully know what was going on. In air combat, in training or for real, you know very few things. The enemy's job is to confuse you. You rarely know exactly how many fighters have launched, where all of them are or what they intend. That is the fog of war, and you fly in it every time.

* * *

The two flights I made that day in Norway show the difference between not knowing and being wrong.

That morning, once we had seen one F-16, we still had a choice about the other one. We could have taken the quiet sky as evidence that he had gone. We had no grounds for doing that. The Norwegian wingman's account settled it afterwards, but it changes nothing about where our attention belonged at the time.

That night I had a much more persuasive picture. If the HUD had gone blank on the taxiway, I would have flown home on the standbys. Because it went on showing me what I expected to see, it kept drawing my eyes back even after the standbys had contradicted it.

Bad information is worse than no information.

The part of your picture most worth a second look may be the part you are surest of and have never checked. The gaps you know about already have your attention.

You do not need to be in a jet to feel this. After the Iran war reached the UAE, where I live, in February 2026, interference with satellite navigation put people in places they plainly were not. A driver on Sheikh Zayed Road in Dubai could see the Burj Khalifa, the skyscraper in the city centre, straight ahead of him. His phone put him out in the Arabian Gulf.[7] The blue dot on a phone is so compelling, and we are so used to believing it, that it is very hard to ignore it. If the dot simply vanished, we would look up and read the street signs. Because it is there, and wrong, it keeps drawing us back.

On the taxiway at Banak my mind reached for an answer and didn't question it. I knew the HUD had flickered. I assumed that because it had steadied, it was working. I hoped I would not need the standbys, and I feared a night flight with my head down over them. By the time I was in cloud, all of that had become one picture, and I could no longer tell which parts I knew and which I had only assumed, hoped or feared.

That is true of every picture, in a cockpit or anywhere else. What you know and what you assume feel the same from the inside. Nothing in your head labels them. On the taxiway I could have said

that the display had steadied. I'd have had a much harder time saying how I knew it was working.

I had done the same with myself. On the phone to Bardufoss I said I felt fine, after more than twelve hours on duty. Looking back, I was probably tired. What I needed to know was whether I'd still be sharp enough if something went wrong on the way home. It did go wrong, and even now I can't say how much being tired had to do with the way I handled it. "I feel fine" was only a guess about how alert I was, and nothing in the cockpit could check it, but I treated it as if it were a check.

Confidence is no evidence of a good picture, and neither are intelligence, experience or seniority. I had been trained for years to question the picture, and I still nearly killed myself by trusting one.

* * *

On the taxiway at Banak I at least had a warning. The display had flickered. At work there may be much less to catch your eye. Last month's sales and next month's forecast can sit side by side on a screen, both worked out to the last pound. One figure tells me what people have bought. The other still depends on what I think they will buy.

In the jet, that wrong picture was found out within minutes. At work it can survive for months. The more senior I am, the easier it is for a meeting to end without my hearing a different account. It is tempting to take that silence for agreement. I still have to find out what the people closer to the work have actually seen.

If I wait to be proved wrong, events decide when I find out. By then, a choice I would have made earlier may have gone.

When a business brings me in, the people round the table usually know the work better than I do. I listen for the places where they seem to be talking past each other. Do they disagree about what to do, or have they each seen something the other hasn't? I can ask that question while I'm still learning the business.

Seeing clearly lets you act with confidence while you are still uncertain, and spot what is developing, while there is still time to do something about it. Pilots are trained in it sortie after sortie, and anyone can learn it.

At Banak the truth was on the panel the whole time, on three tiny dials. I had a reason to look again on the taxiway. By the time I believed the check, I was on my side in cloud.

Notes and references

Introduction: Energising the Ball

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Paul Littlejohn