Improving Pilot Training

Appraising The Critical Competencies

Anticipated demand for pilots is higher than for decades. One option is do nothing, maintain the present system. However, as argued in IPT – How To Do It, clear evidence exists that better graduation outcomes can be achieved – and more economically. Support for the proposition is strong. A lot of work has been done in the area. In short, foundations are in place for building better training courses. Improvements can take effect almost immediately. Training instructors in partner schools in late 2007 will enable superior tuition from Jan 2008. Research underway will concurrently clarify the processes stimulating improvement and ensure that gains are realised.

Anecdotally, some instructors are better than others. "Better" supposedly translates into stronger achievement on course, in terms of learning rate and quality (and happier students, presumably). If all instructors were uniformly of such high standard, the efficiency and cost-effectiveness of the training system would be at peak. The ***High Effect*** *scheme aims to deliver guidelines that will render the entirety of a pilot training process more effective. The resulting courses will produce stronger and safer pilots.*

The development is timely for several reasons. The pool of pilots with enough experience to satisfy airline recruitment requirements is shrinking fast. Better graduates need less "top-up" experience to become fully-fledged aviators – witness the military system. In addition, the characteristics of "Gen Y" are exciting anxiety – for example, undisciplined attention management and intuitive decision-making – may be such as to engender difficulties in both the training and later operational service. Better diagnosis of the Critical Competencies is needed. If any are discovered, powerful training will counter the effects.

Preamble

The National Interest

Australia is a country whose inhabitants mostly live on the periphery. Routes between major population nodes are lengthy, heavily travelled, and vital contributors to National prosperity. The sparsely populated interior is even more critically reliant on transportation services on long lines of communication. Few nations are so dependent. Of all available transport modes, aviation possesses the most potential for defeating the tyranny of distance at a pace consistent with a modern, dynamic, economy. Shortcomings in aviation's ability to deliver efficient and affordable transport prejudice the National interest.

Aviation at Turn-of-the-Century

As 2000 began, aviation was in robust good health. An established pace setter in exploiting technology, unparalleled gains were being realised in efficiency. Fares got cheaper; patronage expanded. Not all components of the system shared the experience. Economies were mainly achieved through clever engineering – eg, lower fuel consumption and better reliability. The Human Factor did not keep pace. That is, improvements in human performance failed to match gains on the technological front. Human error remains the most likely accident cause.

The Human Factor

Accidents are rare, and corresponding insights into flight crew problems infrequent. (And then surrounding dramas may distort impressions.) New technology – data recording; post-flight scanning – does offer a picture of flight crew performance. This view is intimate and accurate. Coupled to objective analysis through disciplines such as LOSA (Line Operations Safety Audit) and FOQA (Flight Operations Quality Assurance), the result is a precise measure of the "fitness state" of key quality and safety factors involved in flight operations. Concern exists that the pace of improvement in technology has not been matched in terms of human performance on the flight deck. There may have been gains, but they are modest by comparison. LOSA and FOQA operations since the mid-1990s have amassed databases that, inter alia, clarify patterns in crew behaviour and professional competency. These databases can be "read" to highlight, for example, instances of poor crew coordination and flight management errors such as an unstabilised approach. As intimated, there are improvement signs, but they are not strong.

Air carriers are able to use LOSA/FOQA data to implement corrective training strategies, and, where gains are being made, the feedback effect is clearly working. Arguably, however, the fix should go in earlier. Thorndike's "Law of Primacy" reminds that critical competencies should be implanted, strongly, from the earliest days. Ab initio training should be the first line of defence against Human Factors deficiencies penetrating the professional sphere in aviation. And the first stage in training design (or re-design) is to identify the desired objectives – in this case, quality and safety competencies.

Conclusion – Improved Flight Training

The attached papers set out arguments supporting the contention that a "Selection Process" for a pilot training course would be more useful if modified to exploit personal information gained from specific diagnostic paradigms to prescribe training strategies for individual students. When coupled to a syllabus that had been "streamlined" to incorporate FITS–type design guidelines, the end product – graduating pilots – will carry safety and professional competencies that are more robust and durable; and that result will have been achieved with an overall reduction in the human and financial cost of the training.

Selection for Pilot Training

The ideas behind the proposition that flight training can be better done evolved over 20 or more years. Specifically, senior experience as an instructor, followed by service as Air Force Director of Training and as Officer Commanding a training base, prompted a range of thoughts on many vexed questions. As it all started to come together, I began to set out the results of my research and thinking. The result is a set of options for improving pilot training. They embrace the role of "selection screening" in enrolling candidates for civilian pilot training – though in ways very different from now employed in those areas where selection tests are applied. In addition, concepts for improved delivery of flight training have been developed. They appear in separate documents.

Screening has been used in military aviation from early days. (Being a good horse rider was regarded highly back then – and who knows, they may have been onto something.) When a selection process was proposed for a civilian flight course I am associated with, discussion ensued as to its role and likely value.

Results from screening for military pilot training do not inspire confidence. Defence Force selection processes are lengthy – to the point of being exhaustive – and *aim to ensure that only those likely to pass the course get recruited.* The current failure rate for military pilot training courses is 45%. Something isn't working to plan.

The idea of assembling a candidate profile to determine if the student would ***fit the training*** hasn't stood up too well. And in the face of evidence of failure, tinkering with *selection* was seen as the route to a solution. Get the tests right and she'll be right.

One could argue otherwise. When a high failure rate is experienced, the ***training*** should be amongst the suspects. Indeed, from time to time, informed watchers of the military pilot training pipeline note that the *training is merely an extension of the selection process.*

None of this, of course, need apply to civilian pilot training. However, pressure to embrace selection is being experienced. Inter alia, it's about being fair to a student.[1] They are about to invest a lot of money. Better to let them know in advance if that might be wasted.

There is evidence, however, to suggest that ***fitting the training to the student*** will be more propitious than selecting candidates on the basis of their presumed compatibility with a *one size fits all* training course. That people learn differently is a commonplace, as is the fact that the same competencies can be developed through different teaching strategies.

So, focus on pre-course diagnosis with resultant personal profiles sensitively applied to design of training prescriptions offer the best chance for pilot training that really works.

[1] It's also about protection against litigation. The day can not be far off when a lawyer will accompany the disappointed student back to the school, right past the sign saying, "Begin Your Airline Pilot Career Here", with a demand for a full refund.

Preface

The attached papers outline the case for discarding traditional selection processes for entry to pilot training courses in favour of more intimately focussed training prescriptions.

In short, rather than continuing to seek to select those most likely to succeed in pilot training – using demonstrably deficient mechanisms – pilot training courses should be designed to ensure that all fit, cooperative, candidates emerge with the complete competency package, strongly held.

The plan is twofold, with testing and training aims:

- The first goal is to replicate the effects derived from the diagnostic paradigms embedded in Air Force selection tests. The record of the past 15 years highlights the safety benefits available from forensic appraisal of specific individual characteristics and aptitudes. The aim is to produce a low cost Internet-based set of diagnostic "selection" tools.

- RAAF pilot selection is based on a level of discrimination not normal in civilian organisations. Arguably, improved training will reproduce the safety dividend the RAAF obtained through selection. The second aim is to apply test information to prescribe training plans harmonised with individual characteristics and learning styles – to achieve higher success rates in pilot courses and stronger graduation standards.

References

Three papers are attached.

The first makes the case for diagnosis and prescription – instead of "pass/fail" selection – to achieve ***High Effect*** training.

The means are not to hand. "Wombat"[2] is a contender for the diagnostic role. Its elements were integrated into RAAF tests (AusBat) in the 80s with identifiable benefits, an experience that validates some of Wombat's design intentions.

It also points to the features needed to attain the diagnostic power needed to support ***High Effect*** training. The second paper sets out typical results gained through use of Wombat. The comments made against typical test profiles are sufficient for trained instructors to design training routines that would remedy any deficiencies thus detected.

The third paper is a whimsical anecdote that points to the trainability factor – and supplies an element of certainty to the proposition that anyone can be taught to fly. (I know! *Almost* … .)

[2] There's more on Wombat later.

Pilot Aptitude Testing

Introduction

Every so often a story passes unnoticed that should be emblazoned in headlines. Here's one: A reduction in the rate at which Air Force fighters crash: was 2 a year; it's now zero.

It's to do with selecting the *right type*. The RAAF changed its approach to recruiting pilots in the 1980s. It took a while for results to show up as changes in operations. But they did, and it's been impressive: No fighter accidents since 1992 (as I write).

Emulating the RAAF experience in accident prevention in all fields of aviation is clearly a worthy goal. We know what changed; we can design and implement schemes with equivalent effect. "Equivalent", as the primary strategy the RAAF employs is discrimination – a tool not available to all organisations.

With hundreds of applicants for every vacant fighter aircraft seat, the Air Force needs to be selective. When warfighting implications – such as performance under stress (ie, while being shot at) – are factored into selection processes, otherwise untenable discriminatory policies are legitimised. The propriety of discrimination is further amplified when the safety factors are introduced – averting loss of life and the economic penalty of aircraft crashes.

Training is the practicable *"equivalence"* strategy. If potent enough, it is able to implant safety factors. Furthermore, when High Effect training paradigms are deployed, the overall result is superior. That is, pass rates in pilot training exercises are better, as is the quality of the "transferred" training; skills and competencies are more robustly and durably implanted.

Worthy of note is that the type of applicant now rejected under the RAAF screening process is an impressive person who passed other selection challenges at high levels of attainment – and who under the previous selection regime would have been favoured. These are not people you'd willingly discard from a recruitment stream less densely packed than the RAAF's. You need not turn them away. Training will get them up there where you want them.

Training

The most effective training designs respect venerable rules, while benefitting from the latest applicable science. Neuroscience is a discipline that in recent years has offered pedagogues enormously – *potentially* – valuable guidelines for training. (That the offer has not been much taken up does not detract from its ability to contribute to human development.) Precepts from Neuroscience act as catalysts within traditional training activities to render their influence on course designs substantially more effective.[3]

Traditional training courses, with minimal refurbishment to blend in the new science, will possess the power to enable students to elevate their safety competencies to the maximum achievable by normal people. Zero accident rates may thereby be achieved. Essential to effectiveness in training is the "cycle" – that is, pre-training testing and preparation; post-training appraisal; and, continuous reinforcement thereafter – the "rolling training loop".

[3] There is a booklet on this beguiling topic on my website.

The test devices operated by the RAAF were paramount in the remarkable achievement. But the gear is neither cheap nor portable. However, if you know the essential components of the challenge paradigms faced by applicants you can replicate the *effects* of Air Force appraisal. An online service is obviously ideal. An organisation that develops and offers that will gain custom throughout aviation – and from other domains.

Background

The Air Force improvement in safety over the past 15 years needs to be seen in perspective. During the last two decades of Mirage service, 2 aircraft per year were lost. Hornet attrition was planned at 1 per year. In the early years four aircraft crashed, seeming to confirm the projection. The last was in 1992. There can be no gainsaying the safety reality. Something changed. *Knowing what it was permits design of systems to emulate the experience.*

Curiously, the official policy changes responsible for the result were not aimed at safety. It was about pilot "trainability", reducing the failure rate on courses. The beginning of the story is in Fit to Fly. A Mirage pilot lost control during a barrel roll under cloud. He recovered from the ensuing dive – down amongst the tops of pine trees. The plane flew clear of the trees but with no thrust and losing speed. Intakes full of pine foliage, the engine had snuffed.

After 4-5 seconds gliding above the trees, the plane dived into the forest again and crashed. The pilot did not attempt to eject. Medical evidence confirmed he was conscious at impact. His failure to escape – the ejection system was within its capability envelope – remained a mystery to investigators. Their inquiry closed without drawing conclusions on the question.

The investigators had, however, thoroughly explored a particular thesis – that some pilots are more error-prone than others. The idea was that a certain class of person was a "carrier" of a "rogue syndrome". Specific personality markers were identified. The flying ability of these people was in all other circumstances beyond reproach (or better). The safety liability was that they would experience *cognitive collapse under stress*. In the case at hand, the pilot, in a live-or-die situation, was disabled by circumstances and incapable of initiating ejection when he should have. But the best we could do was assemble a theoretical concoction explaining the syndrome, highlight the profile, and run it all by the senior folk. But it made a lot of them very nervous and there was no interest in exploring it further. This was the mid-70s.

In 1984 I became RAAF Director of Training (DT). Amongst my early projects was a review of pilot training, prompted by persistence of an uneconomically high failure – 50%. My study coincided with the tail end of a review by the Director of Psychology (DPsych) on selection methods and tests – initiated for the same reason – the high failure rate.

The selection test review sought, inter alia, to identify means for detecting the *hard-to-train* person. These were pilot candidates whose results in the test process placed them amongst the *most-likely-to-succeed* entrants to pilot training, but amongst whom the failure rate was disproportionately high. You did not expect them to fail, but many did. If you did not select these people the failure cost would be lower. The bean counters beamed upon our enterprise.

Wombat and the Swedish Defence Mechanism Test (DMT) were amongst the tests trialled. Both possessed elements that were regarded favourably – for picking the *hard-to-train* case. The forensic elements of Wombat were included in AusBat. The personality profiling effect achieved by the DMT was reproduced in the interview process.

Comparing notes with DPsych, we agreed that trial evidence strongly supported something my accident investigating team had suspected – that the crash pilot had the *collapse under stress* personality profile and that the same profile precisely matched *hard-to-train*. That is, an *error-prone type* was also the one who had been, potentially, *a difficult trainee*.

There's an inherent paradox. Some difficult trainees pass easily, and with high enough scores to qualify for fighters. Here's why: They're naturally very efficient learners; "get" sequences readily – and thus need little actual training. And when on a roll, they need no remediation. Presenting as gifted "natural" pilots, their progress is marked by rapid development with little input from instructors. (The instructors are really observers of self-induced learning by autodidacts.) Sequence after sequence mastered, the course is passed with flying colours.

Others of the same type perform dismally. The syndrome kicks in when they get a sequence wrong first up. *But it's already been learned* ... and the learning is deeply embedded. It's the downside of being an efficient learner – strong resistance to re-training. They go on making the same error(s), repeatedly. Instructors' corrective routines are ineffective. The downward spiral to failure follows.

All of this, of course, is subjective, from observation. Nonetheless, once the thesis became more widely discussed, correlations with *"the type"* and accidents were noted.

And it explains why a change in Air Force recruitment – to not recruit the *hard-to-train* type – delivered a dramatic safety dividend, notwithstanding that it had been invoked as prudent economic policy. It's a classic case of unintended consequences. We set out to reduce the cost of "wastage" from pilot training – and eliminated the human error accident.

This, of course, is just the start point for the *training-in-lieu-of-discriminatory-selection* strategy. As noted, *potent* training is the solution to a problem. The conclusion is based on a syllogism: Competencies are involved. They're cognitive competencies, but that's irrelevant. All competencies are learned. That which can be learned can be better learned.

The basis of the success of the "syndrome carrier" who sails through pilot training is their rapid, intuitive, uptake of learning. But, virtually the same person might encounter the *get-it-wrong-first* block that activates the syndrome. It takes over and the downhill slide begins. Naturally programmed for smooth learning, when "wrong footed" in a sequence, they become stressed and confused. That degrades cognitive capacity and eye-hand coordination – to produce helplessness incompatible with re-learning. The error-prone factor lurks within. It manifests as abject performance under stress.

The autodidact is a natural learner. He picks up competencies without ever experiencing the gross hot-sweaty stress we ordinary humans suffer when learning complex tasks. And as we experience it again and again, we learn how to cope with it. Indeed, with practice, we get good at managing under stress. They don't. Course progress looks great in the file as long as they're on the roll. The downside is that their ability to perform under stress is not exercised. It remains underdeveloped. It's a serious defect. Remediation demands powerful training.

As noted, the syndrome carrier who fails pilot course is indistinguishable from the one who breezes through. They've both got the latent defect, but one's never had it triggered. For the one that has, cognitive overload *jams the learning circuits*. He fails, the other passes. Hidden

in his success story is the gremlin: When he encounters a particularly tough situation in later operations, stress effects might well *jam his cognitive circuits*. Accidents are thus caused.

New science provides evidence supporting the contention that training can eradicate the syndrome. It's not an easy case to run. Aviation types tend to be conservative – and some of the arguments contain self-contradicting elements – good learner, error prone type?

It hardly matters. The syndrome is not irreversible. Targetted training will start with a person being appraised (or self-appraising) to determine, inter alia, their learning style. We all learn differently and do better on a course that is tailored to our individual needs.

When personal training prescriptions are applied, the results are stronger. Everyone benefits from intelligent, focussed, training. If there is any error-prone potential in a person's cognitive make-up, it is simply rendered inoperative by ***High-Effect*** training.

There's no need for singling out or counselling. The course handles all comers according to their needs. Accordingly, the *hard-to-train* factor is never encountered. Training performance is better all round, for system and students. Once they graduate, their cognitive competence is robust. Any threat of cognitive overload is neutralised. Effective continuation training will maintain that desirable state.

Testing for EM Fitness

The Wombat

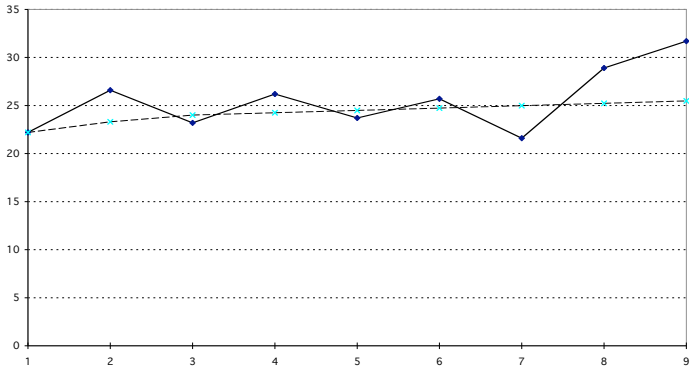
Wombat[4] measures cognitive performance of a particular nature – the mental mechanisms (cognitive skills) that deliver a pilot's Situation Awareness and comprehension.

The two are not the same thing, though interdependent. A pilot might have a strong Situation Awareness information scan (Time Management), but poorly interpret what he or she sees – eg, a visual illusion (Information Processing). Good SA relies on accurate perception as well as rapid information assimilation. Wombat measures the "fitness level" of both competencies.

A test takes two-and-a-half hours. After a 50-minute introduction, the test subject undertakes tasks over a 90 minute period. Performance is recorded as a score at each ten-minute interval. The following chart is a typical Wombat score profile.

(I should note here that most users of Wombat-type tests in pilot selection only use the overall total score. This is unfair and discriminatory – as will become obvious as you read on.)

Subject #1



The unbroken line joins score points. The dotted line is a 'standard learning curve'.

This test subject's commencing score is 22.5. He's off to a good start and finishes strongly – excellent signs in current or intending pilot (GP, surgeon, racing car driver, etc).[5]

Performance after the first ten minutes is, essentially, a measure of latent or natural talent for the task challenges. (But only in a person who has not had exposure to SA-type training, such as learning to fly, or playing computer games. That background tends to improve scores.) The competencies measured are those that deliver *Situation Awareness* (TM & IP). That is, Wombat is assessing *situation awareness maintenance,* over time, and under stress

Loss of situation awareness is by far the main cause of accidents (aviation or other). Strong performance on Wombat marks an individual as possessing *defences against error.*

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4 See www.aero.ca for details.

5 Readers who are familiar with Wombat might wonder at the scale of the 'Y' axis. I have used the score as at the end of each ten-minute period, as opposed to total or predicted total score.

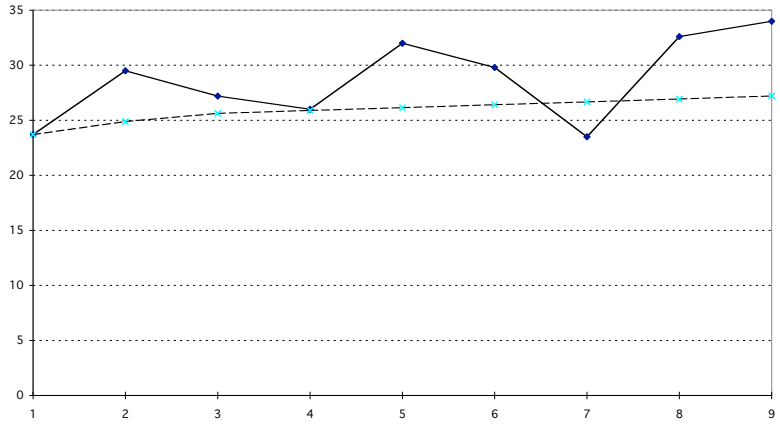
Having said that, it is important to stress that a lesser score performance can be overcome through diligent training, *provided the right learning opportunities are offered.*

The standard learning curve profile is the most common experience in the majority of Wombat tests. That is, a score may not be very high, but the overall shape of the attainment profile follows the same basic skill-improvement plateau pattern, as seen on the diagram.

Other Score Profiles

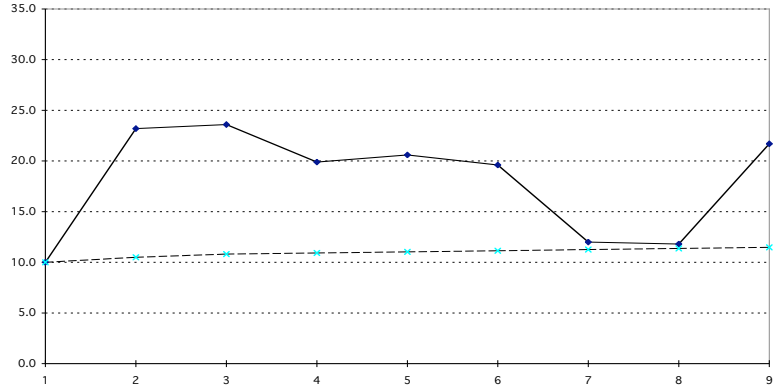
As you would expect, there is a fair bit of variety in Wombat score profiles.

Subject #2



This is another good score; a strong start, sound SA maintenance throughout, and an especially strong finish. Not all start so well, though the final score is in the same ballpark.

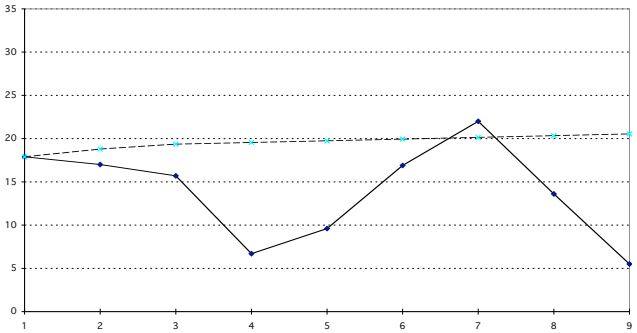
Subject #3



This pilot (they're all trained pilots) overcomes a latent difficulty – ie, he's not a 'natural' – shows good enough performance, including a downturn from which he recovers. The overall score is within the 'acceptable' range for most airline recruiters who use Wombat.

Not all pilots are so dedicated and diligent. The next chart is from of a current airline pilot.

Subject #4



This pilot has a position in an air carrier and, frankly, he did not care about the test at all. It is a weak beginning – and the level of SA competence he daily brings to passenger carrying. The drop in performance at the 30-minute mark was due to lack of concentration. He began to recover, but collapsed again through insufficient tenacity – no *'Tiger'*.

This is a poor result for a very experienced pilot. More significant, he thought he'd done OK. Pilots such as this need the rude awakening they can get from a properly debriefed Wombat session. On the other hand, no one should be subject to that form of frank disclosure except they know of the existence and nature – and certainty of effect – of remediation training.

As noted earlier there should be concern about the 'adaptation' factor introducing higher likelihood of pilots making errors of judgement. Wombat reveals that syndrome.

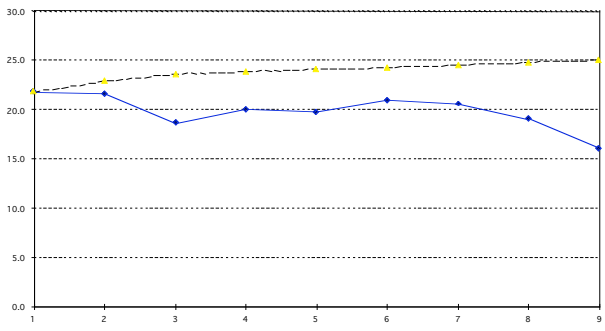
Detecting that Pathogen

Wombat task challenges are not unduly difficult. And they are not culture-specific. High-skill non-pilots such as first grade footballers score about the same as pilots. The tasks check out the cognitive processes delivering Situation Awareness. The test is a fair and reasonable challenge to any pilot, whether practising or intending.

It does impose stiff pressure and is accurately described as appraising the pilot's ability both to maintain Situation Awareness – *and to do that under stress*. In the first two charts the test subjects continued to improve through the test, demonstrating stamina under increasing pressure. Less cognitively robust subjects fare less well.

SA breakdown is a virulent pathogen evident in many crashes. This chart shows a mild case.

Subject #5



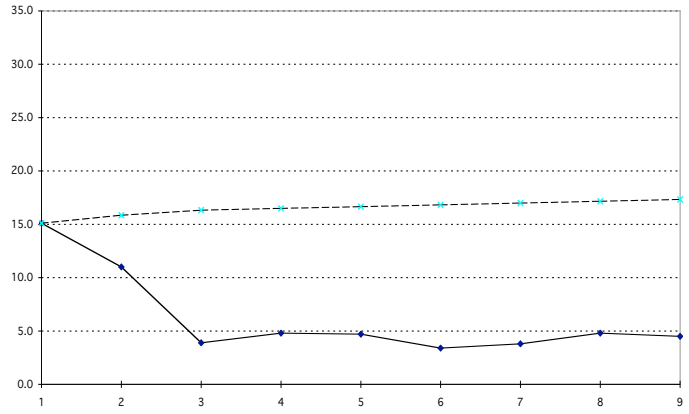
In terms of overall score, this is not a poor performance. (It starts at about the same innate score level as Subjects #1 and #2). But the pilot would have done better had the decline not occurred. Given his result after ten minutes, he clearly has the *potential* for a higher score – or stronger SA competence. As before, the learning curve line on the chart shows the normal expectation that performance will improve – even though only slightly – throughout the test.

Most important, a breakdown in Situation Awareness such as this, in flying, is a real hazard. SA attenuation degrades communication and crew coordination. Erroneous interpretation of the 'real world picture' – cf the QF-1 skipper's unduly optimistic reading of runway ahead.

It might be argued that Subject #5's loss in performance was not great. Not so. It got worse towards the end (as the stress factor intensified). You'd want to see it recovering. The stress imposed by a Wombat test, on terra firma, is nothing like that associated with flight – say, in a thunderstorm at night. We need to know if pilots have high levels of SA resilience.

Subject #5's performance was an example of waning SA competence. Although not major, it is grounds for concern. Also, being a mild case, it is easily reversed through training. On the other hand, I have seen more troubling results. See the next profile. Once more, it is from a senior practising RPT pilot. (He could be flying you next time you travel):

Subject #6



This is clearly a gross loss of situation awareness – and, again, the pilot was wholly unaware of that. (He reckoned he'd done OK on the test.) The result is a serious safety concern – total loss of SA. In a crew, the subject, under pressure, would have withdrawn altogether from communication, though stubbornly remaining in command, while having no idea of the true state of affairs he was flying in and into. (Many accidents show this pattern of behaviour.)

Training will remedy this pilot's defect. It'll need to be potent, tough, training, and he'll find it hard going. But it can be done. The trainability factor is clear from the following account– from the earliest days in my quest for tests for the error-prone gremlin.

The World's Most Uncoordinated Man

Years after the day in question, Rob Lee became Director of BASI – the Bureau of Air Safety Investigation. He did the job so well it was taken from him, but that's another story. A PhD in psychology, Rob had spent, before the BASI appointment, many years in research into human factors phenomena that impact on flight – those endlessly fascinating concepts that feed aviation's never-waning allure and makes addicts of all right-thinking people.

At the time, back in the 70s, I'm on a job looking into flying training. Rob is doing research at a nearby university. We'd done some accident investigation together. So I'm not surprised to get a call from him to come down and check out a device he thought of interest.

To spread the wealth, I collect colleagues A and B. We set off. A is a fellow pilot. B, a man fascinated by aviation, is working on design of part-task trainers and pilot aptitude testing.

B offers to drive, as his car is close by. We accept. Big mistake. At the first roundabout, A and I realise … *this bloke is so uncoordinated ... he can only do one thing at a time.* While he's pushing the clutch in … *steering stops! Gulp! Clench!* Clutch fully depressed … *there's a snap correction* … and guidance is briefly resumed. It stops soon enough … *while the gear stick is being moved*. Progress around the circle is a series of straight legs and sharp turns. And on it goes, each individual action getting exclusive attention for its duration. Terrifying.

We arrive at the uni hot and sweaty … on a cool day. Rob takes us to his baby. It's a computer-based tracking task device. What is different is that, till now, tracking challenges have been 'single channel' – one 'joystick', one moving target to chase. This beast has two of each – the first dual-tracking system. Rob is unsure whether it presents insurmountable skill demands … or not? If not, could it be used to measure pilot aptitude? It certainly looks to be an unrealisable task challenge. But you can also see its possibilities as a pilot-potential test.

The pessimistic, gut-feeling, prognosis is soon confirmed. B, the part-task trainer man, had sat down and engaged the machine. His tracking is dreadful, the cursors zig and zag, past and around the targets. The score read-out is never above 5%. Clearly, it's beyond human ability. End of story. Rob's a tad downcast … until A steps up and has a go. The little dots move, he repositions the cursors, wiggles the controls, follows the targets, scores 85% right away, gets better. Maybe it can be used. My go suggests there is something in a positive outlook. The drive back confirms that the *World's Most Uncoordinated Man* is at the wheel.

Nearly two decades later, B gets in touch. After many years of trials, he has perfected a pilot-potential battery of tests that includes the dual-target tracking challenge. I go over to take a look … and inwardly scoff at his offer to demonstrate. Hmmph. Him! The *World's Most Uncoordinated Man*. I've seen him make a total hash of the task.

Then he sits down and ... a miracle! It's like a virtuoso at the grand piano, Yehudi Menuhim on the violin! The targets move around, at random, the toughest challenge. But he tracks unerringly. The controls move with sure precision. Readout – 95%! It dawns on me. He's been doing this through 15 years of trials – hour after hour of practice. He's become an automaton in the tasks. At that instant, any vestige of doubt as to the efficacy of SA competency training evaporates. He drives me back to my accommodation. It's still a manual car … but he's a different driver … beautifully coordinated … *Mr Smooth!*