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SUBMISSION TO INQUIRY INTO PROGRESS UNDER THE NATIONAL ROAD SAFETY STRATEGY 2011-2020

To Transport and Infrastructure Council via
roadsafetystrategy@infrastructure.gov.au

PRESENTED BY: VINCE SUNTER
ADVANCING PROJECTS PTY LTD

On Behalf of: Advancing Projects Pty Ltd, ACN 136 473 599

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CALL TO ACTION

Experience shows that making substantive impact in reducing the road toll, and the many related costs to our society, is 'quite difficult'. It has been so for decades. Better vehicles, roads and systems make incremental improvements but, if the T&I Council is to achieve game-changer outcomes, the strategy to do so needs to include taking game-changing actions. This submission outlines one opportunity to do so.

The individual making this submission is going to drive those game changer outcomes regardless. A personal target to reduce the road toll by 20% has been set, additional to what the T&I Council might do. When starting this endeavor, the intent was to quietly work away to initial success, and then bring it to the world. However, that hit a snag – expected funds did not materialise, and will not for some years.

The call for action to the T&I Council is to realise this initiative has clear alignment with its core charter, and high potential to be 'that game-changer we need while we wait for autonomous vehicle uptake', and act with credible urgency to accelerate realisation of results. The challenge is being put directly because a 'more gentle' position put to the NSW StaySafe Committee in mid-2017, who did some great work around driver training issues was, for reasons fully understood, only able to initiate more govt reports.

The proponent has spent \$30k of personal funds constructing a prototype driving simulator designed from the outset to roll out to the entire population for training and assessment purposes. Initially for new drivers and later for all drivers. The ultimate goal is to change the culture so people view those that cannot pass simulator tests in the same light as drunk drivers. Licenses genuinely become a privilege not a right. That goal may be some way off; in the interim realistic experiential training will see people making better choices while driving, exactly as all of us that have had narrow escapes or minor accidents do now.

What the T&I Council could choose to do is to provide some 'no strings' seed funding, and a government official to provide oversight to ensure proper use of the funds. Facilitating employment of people to complete and develop the engineering detail of the project, rather than it all be time-dilated personal exertion effort, as is the current pathway. Of course there would be 'details', but easily sorted.

This project has high potential to make a substantive improvement in the core outcomes required. Maybe not by 2020, but within a few years after that, definitely. In addition, what a great export industry for Australia, building large quantities of equipment, and it will be the catalyst to create a major new industry in road safety. The simulator centres are just the tool; lesson plans are the key to outcomes, paying dividends well beyond slashing human and economic costs in this country and many others.

Can the T&I Council take such action? Earlier rollout means saving more lives than would otherwise occur. However, occur it will, as the proponent is on a mission to make it so. A meeting would leave no doubt about the individual capacity to do this thing. Technically, commercially, full rollout, and everything in-between. This partly explains why: <http://au.linkedin.com/in/vincesunter>.

The proponent's problem is that funds from a proof-of-concept installation of a separate patented mining industry technology in 2016 kicked this project off, but have depleted. Additionally, a business partner of 20 years passed away April 2017. Getting the mining technology adopted is slow, and requires an inordinate amount of continuing effort. A key major miner head recently said technology adoption would start from 2020, and slowly at first. The underpinning reasons are common, so no funds any time soon.

It looks like final year uni students may do some of the work, but real progress needs more help. Ring Vince Sunter on 0414 706 875 to chat about 'possibilities'. Or keep reading, and ring later...!

SUMMARY

A project for a game changing approach to driver training formally kicked off in August 2016 in Newcastle NSW. It is well under way and the details published on www.driversim.com.au. For clarity / convenience, the relevant web pages accompany this submission as Appendices.

What this project is about is taking some of the 'heat and stupidity' out of decision-making processes across the driving 'fleet'. This will create far better outcomes as, in the moment of potentially making a critical mistake, a better choice occurs. Which means making the right choice many times when it did not matter. Only a changed mindset can get this to happen, and that is what this project will achieve. Substantial improvement to road toll results will necessarily follow.

A strong personal desire to directly cut at least 20% off the road toll (above what better roads, vehicles, policing, etc. produces) drives this project. The method is via delivering highly realistic driving simulation training experiences economically to large quantities of people in a way that the lessons learned have a high likelihood of retention. Consequently, people make better choices, in the same way we observe narrow escapes and actual accidents that don't kill people influences what they do thereafter.

Expected delivered cost is \$35 per simulator training session, with most probably about 10 sessions required across the red / green P plate period. Great potential for use with repeat offender programs, senior licence validation and the meaty topic of population competency testing and development. As well as entertainment and many other spin-offs. Plus it has great export earning potential.

The proof-of-concept prototype is fully constructed and currently in the fit-out stage. Detailed development work will follow to implement full control and display interfacing, before rolling it out to a trial multi-berth installation. To give an idea of expected scale, just to handle new licence issuing in NSW, would require twenty 15-berth simulator centers located in major population centres around the state.

The prototype is being built from within the inventor's personal (scarce!) resources. There is a plan to fund the full roll-out, but that depends on income streams not yet secured. Regardless of exactly what happens there, the T&I Council may have an interest in ensuring that this project advances at an accelerated rate, and ensure impediments for integration in the licensing system and funding assist advancement of the project and implementation in the best possible way.

There will be many "hold" points along the way. From the inventor's perspective, the first key deliverable is to demonstrate the ability to drive around in a [Need for Speed](#) environment, or similar, and believe it is actually happening without any (or much) tendency for simulation sickness. Whilst it is notoriously unreliable predicting the timing of R&D style projects, expect achievement of this milestone within 12 months with sufficient assistance, or three plus years without it. Once achieved, this milestone will allow interested parties to try it first hand and make well-informed decisions about the extent of involvement and/or support going forward. In addition, this simplifies access to more conventional funding sources in the event that plans to self-fund do not materialise as expected.

DOCUMENT STATUS

This submission document is for public release by the T&I Council as desired. Provided separately, is the Patent 2018200822 / PCT/AU2018/050072 document, not for public release outside of actions taken by the patent office. The confidential patent document is to give the T&I Council a clear illustration of the depth and substance behind this project. Preparing the international patent docs required extensive searching and, of the hundred or so 'driving simulators' listed, none come close to this design. Not in configuration, quality of training experience provided, or cost to construct anything of similar performance. Which answers the question "If these things were going to be any good, why hasn't 'somebody' done it yet?" as it turns out 'somebody' is writing this submission!

BACKGROUND

The inventor / proponent, now a 60yo professional mechanical engineer with deep multi-disciplinary skills and experience, originally put a confidential detailed submission to the then RTA in June 1998, seeking support for this idea. The RTA were very keen on the concept, but were not able to provide any assistance at that time. Since then, technology solved some potential problems and finally, in mid Aug 2016, TOOK the decision to dedicate what meagre resources were available to making it happen, or at least developing a solid body of knowledge for others to take further.

This project is largely driven by altruistic intent, and a bit of "because I can, I should" ethics. To succeed requires commercial acumen and a viable business model, another area of strength for the proponent.

Whilst this project is not yet a mature technology solution, it has cleared all the key technical hurdles. It is just 'a job to do'. Anybody that looks at what is happening here soon concludes that this is 'the one' to get genuine outcomes for the population.

The technology is highly portable between cultures - what it comes down to is developing the right "lesson plans". There is a lot of quality science around that already, plus more built into this new approach to driver training. Please refer to Appendices for details.

CURRENT STATUS

The project was proceeding very well before placing it on hold with the death of the business partner to allow full attention to matters arising there. The status of the prototype and surrounding activities instills a high level of confidence that the prototype is going to achieve the intended outcomes. Details are on the [website](#) and will be added to intermittently.

A careful review of the budget and detailed implementation process has confirmed a target of delivering training for \$35 / session in the context of a compulsory driver-training program. This will involve two operators on site at all times; one doing oversight / maintenance tasks, and the other running supplemental classes / "handling" students in the many ways that may be needed.

The only critical assumption with the \$35 figure is that high simulator module occupancy rates will occur.

NEXT STEPS

The simulator is mechanically moving as expected with manual control. Next comes the electrical control and protection systems fit-out, and development of the control module software. That will get the prototype properly responding to operator input from steering, brake and accelerator controls.

Next comes the PC interface, which will be straightforward to do but the challenge will be to properly calibrate the simulated and real motion. This is not expected to be problematic because of the techniques being adopted to implement it, but is an area where fine tuning can take a while, given this is THE most critical aspect to ensure a low propensity for simulator sickness effects.

"Success" will be when a subject can drive in a [Need for Speed](#) environment (watch the Fortitude Valley promo video), or similar, and believe they are there without any / much tendency for simulation sickness. Also, demonstrate use with appropriate training software, such as <http://citycardriving.com/features>, www.carsim.com/products/index.php, www.3d-driving.com and www.stisimdrive.com/products/; there

are many more. This is the gold star achievement for the project, as everything after that is simple. Anyone that tries this demonstration will be hooked on it as the exceptional training solution it will be.

In a recent discussion with an electronics technician who has spent many years working on and with high-end simulators, he said he loved the details of this project. He formed the view all the surprises coming were likely to be to the upside. Good news indeed, from one who knows!

Of course, then the REAL work starts. Behavioral experts need to develop lesson plans and training implementation strategies. Many initial thoughts exist around how this is best done, but it is still a job to do. In practice, a team approach would develop one highly effective lesson to underpin and validate implementation plans, and build depth from there.

As the above activities progress, it will be evident that it is just a process to go through, and planning for the first full rollout multi-berth simulator system can begin. This may be as part of an optional pathway to licensing if the RMS is able to accommodate that. Alternately, it will be commercialised as a complementary training method to conventional driving schools.

Taking this a step further – read the About Us page in the Appendices to get the idea of the depth of the convictions here. Past performance indicates that getting the scenario outlined to happen is totally doable. What is less certain is whether a submission to the T&I Council will actually provide any substantial help along the way? We live in hope...!

FUTURE ROLLOUT DISCUSSION / ASPECTS

To set up a full 15 berth two operator simulator center in a rented warehouse is estimated at \$703,000 to establish and \$880,000pa ongoing to operate. The operational cost includes reasonable finance costs, depreciation and a 10% contribution to ongoing R&D development, as well as all the costs to operate and maintain such a facility. No RMS costs are included, as there should not be any. Just electronic reporting of attainments, much like pink slips. The simulator technology is very suited to motorcycle and commercial vehicle implementation, but these are not initial areas of focus.

Re that 'critical assumption (re) high simulator module occupancy rates', for a 15-berth simulator center operating 5 days a week, 48 weeks a year and delivering 7 sessions per module, that is 25,200 sessions pa. Divide the operating cost by this gives \$34.92; hence the \$35/hr expected charge-out rate.

In practice, simulation centers will run longer during the day and weekends, and more total sessions pa will accrue. Operational experience may find that a practical max for a simulator session lesson is 15 minutes when the limit for what a person can learn in a lesson is hit, or sickness rates start to climb, or any other reason. Three sessions per hour could be viable, especially if supplemented with classroom learning. Or maybe it will be 10 minutes' simulator, half hour in class and 10 minutes back in simulator, so two sessions per hour can be accommodated. In either of these scenarios, only the variable costs increase (with a rock solid electronic scheduling system, plus a strict maintenance regime), so more net funds get generated to increase the R&D component / reserves going forward.

The current intention is that the set-up and operating funds come from the inventor's other engineering business endeavours, when they bear fruit. They come from an innovative way to achieve a massive boost in productivity and throughput in the mining industry. An installed proof-of-concept prototype is working successfully. It is regarded as "proven", but ownership and market factors have meant major projects are some years away, since nothing happens quickly in mining; a very unpredictable process!

If personal funds provision in a timely manner is problematic, alternative sources will be explored. There is no chance that entrepreneurial funds will be accepted as the preference is to wait rather than see any pressure to push service delivered pricing beyond what is set out above.

Bank funding is a possibility, potentially needing govt guarantees as securities could be a problem. But first, exploring sponsorship style of support and altruistic donors, as well as looking to crowd funding for the latter – perhaps with the sweetener that the one or two-axis continuous 360-degree versions mentioned in the patent would also be built, and run jet pilot or similar VR software, up to the value put on their contribution. If the total sum of the initial investment was increased \$100k should cover building this, and sell time share at a rate that covers the building of all the rest as well.

Note funding options above haven't been thought through in any detail, as the expectation is to self-fund. If timing of said funds is a problem, serious proposals will be formulated to deal with the desire to not see progress impeded by funding scarcity. Now that the "Go button" has finally been hit and the base assumptions tested, nothing is going to stop it. Success with tricky projects has been a pattern of life for this inventor, who needs to point out these are not lightweight statements or ego driven pronouncements, just an engineer telling it like it is, and you know how engineers so love to do that!!!

POTENTIAL EXCEPTIONS AND PROBLEMS – A REALITY CHECK...

Being a one-man endeavor is risky. The person driving the core technology needs to stay in good health and not have an accident. Picking up the pieces of this to be carried on by another with little or no handover would be hard, if that day came. This project is currently only a hobby, albeit one that a passionate interest exists in making a difference to the world by its pursuit. So subject to the vagaries of varying focus. Oh, exactly as is happening right now, this submission (and the PCT patent) aside.

The tasks of the core engineering business need very diligent attention, as that is where funding should come from to roll this out. Burnout from the extreme volume of tasks taken on is also a hazard.

To reiterate the point above, the other main risk is that endeavours in the mining innovation area may not yield the expected returns, and funding the expansion of the simulator project when it is ready to go is at risk. Probably, this won't happen, but the timing of future funds is quite unpredictable. When the simulator technology is mature, it needs to be being rolled out; not waiting for funding / attention.

WHAT CAN THE T&I COUNCIL DO TO SUPPORT THIS PROJECT?

Of course, the T&I Council is welcome to make any decisions it likes here, but it is suggested activities that have the licensing authorities looking at how they would integrate this sort of technology into the licensing system would be helpful.

In addition, anything the T&I Council may be able to do such that people or entities support this initiative by donating / contributing to the endeavor. Initially, any funds received would be spent on professional services to relieve the one-person bottleneck in getting every little bit to work 'just so'. After that, it would be sensible to construct a prototype of 'the rocker' (see patent docs) as it is impractical for the inventor to personally fabricate another one. However, rolling out the rocker design as the one more likely to be in the multi-berth centers, would remove an avoidable delay whilst the learnings from prototype 1 are transferred to the rocker and checked in detail.

SOME (NOT DIRECTLY RELATED) 'BIG PICTURE' OBSERVATIONS / SUGGESTIONS

Some personal perspective to add to the mix; perhaps more of the nature of a separate submission?

Look at what is going right. So much of the time, for so many of the people, NOTHING HAPPENS. Despite their many mistakes / poor choices. There is an engineering analogy in the science of Reliability Engineering that the application of the thinking therein may assist identify actions and decision-making in areas other than those directly addressed within the current submission.

Across a population we see chaos, and decry the failure of what has gone before because some isolated individual/s have moved well outside the place where ANY of our intended mitigations can have effect, eg the 10 times disqualified guy leaving a methadone clinic and killing that lovely family at Christmas.

The T&I Council is essentially looking at ways to make the environment more fault tolerant, trim off the high risk individuals within it, and convince the rest to 'get with the plan'. Separately, the headline statistics are about deaths. The multiplier on serious injury, more for minor injury, and higher yet for damage to goods and chattels, all inform the true cost of mistakes, which is a much more pervasive issue. There is another way of looking at this than trying to do even better same-same conventional thinking.

Exactly the same issues as a rail network experiences across the fleet. Required reliability figures initially seem absurdly high; in-service failures (fatalities) must not exceed very low numbers. 'Limp homes' (major injuries) only tolerated to slightly higher levels. 'Out of interval return to depot' for unscheduled repairs (minor injury accidents) still required to be very infrequent, and 'fix next service' (biffs and bruises) tolerated to a still low level as reputational damage is suffered while the defect is carried around.

A proper understanding of the thinking behind what is going on in the above para will improve the overall perspective the Council can apply to solving the problems here, as clearly grasping some of the systemic issues from a fresh perspective will generate newly invigorated and better informed actions. The rail industry is performing orders of magnitude better than the road toll, assuming some equivalence between breakdowns and road deaths and, most of the time; human error causes both these problems. Sure, they are not the same, but they are not as different as one might think.

Taken alone, the statistics in the 2017 status report look hard to improve on. The baseline figures are 6.6 deaths per 100,000 population, assuming this only refers to people of driving age, or else the ratio to total population (which could be an environmental factor wrt percentage driving) skews the figure to be even worse. These people did 0.63 deaths per 100 million km. If we leave out some adjustment due to multiple occupant fatalities, the simple maths looks like this:

$6.6 / 0.63 \times 100,000,000 / 100,000 = 10,476\text{km}$ avg travelled per person per year.

Of the people doing that, one in every $100,000,000 / 0.63 / 10,476 = 15,152$ people will die.

Assume avg speed of 70km/hr; each person is travelling for $10,476 / 70 = 150$ hrs x 3,600 = 538,766 secs

Assume that it takes 10 seconds to create an accident situation that ends badly, that means that one fatal accident period has daily odds of one to $538,766 / 10 \times 15,152 / 365 = 2.24$ million against. By 2016, this had improved to a whopping 2.71 million to one against, but they did drive 91km less that year.

No wonder people say, "It won't happen to me", adding "today" or not, largely, they are right! Continuing the parallel of the rail design issue, what happens is the humble engineer gets equivalent figures to the 'less than 1 in 15,152 people may die' and looks at the vehicle, splitting it into component modules and sub-components and gets astonishingly small figures permitted for individual allowable failure rates.

In effect that leads to a 'causative factors' review as it is impossible to credibly state that 'something' can be done to change a module from a reliability of a failure in say 20 million cycles to one in 40 million

cycles. Whilst improving a tolerance etc may actually achieve that outcome, it is not reliably predictable. This is the conundrum of reliability engineering and road toll alike.

The engineering thinking, like road toll improvement, will first look for known causes and reduce them, but soon moves to systems once the readily identifiable 'wins' are had, looking for things to change that will affect everything, and making an assessment that this is broadly for the better. This thinking takes rail passenger cars from failure rates of 1 in 50,000km early in their life to 400,000km and above. This style of strategic thinking, applied to the road toll issue, is likely to identify new areas of worthy endeavour, so is 'an area of opportunity'.

Note changing everything is not a given for ensuring improvement, due to occasionally flawed assumptions. For example, and a personal concern about the system sometimes 'getting it wrong', is the often single-minded belief that reducing speed limits is the panacea to all ills when, applied inappropriately, this can actually create a worse situation when it should do the opposite. Building latent risk into the system is often largely invisible, but especially deadly as the bad outcomes occur and reporting does not identify it, so worthy of specific comment.

Community acceptance of speed limits matters. Suggesting the solution is to educate people about this is not a 'reality grounded' strategy. Ratcheting speed limits down inexorably below what those 15,151 people 'getting it right' think is OK, leads to mass breakout behaviours. Greater speed differentials then exist between compliant drivers and frustrated drivers, inadvertently creating a more dangerous continuing situation. An accident happens and the first thought is to reduce the speed limit further, rather than the potentially more effective one, for the specific site, of raising it. Policing is not an effective mitigation – better to avoid making the error in the first place, and flush out those already 'locked in'.

I can quote many examples where I routinely observe this increased disparity of travel speeds, long after the change occurs, and many more with highly appropriate, generally observed changes. The real task is not to flesh them out one by one, although that could be part of a strategy with the correct reporting questions, as opposed to a 'whinge hotline'. Better to have a pro-active strategy that checks for general acceptance of the 'needed' change, reversing it where appropriate. Whilst this will be a contentious point, it is not an area where 'getting stubborn' gets better results, as it can become about egos rather than making well-grounded workable decisions. Community acceptance is a real, daily issue as those millions of km rack up, and pigeonholing it as a training issue of some kind is locking in deficiencies, not improved results.