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Trouble in Aviation Security Paradise

By Steve Wolff

There seems to be trouble in Aviation Security Paradise and it has been coming out into the open (or at least into the press) over the past few months. It started with a couple of shots aimed our way but was most recently put front and centre by the terrible attacks in Paris on Friday 13th November, which will have large ramifications for aviation as well as other security modalities.

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It has seemed to me - and to others - that the past few years of relative calm has led to a dialling back of our commitment to enhance security in favour of improving passenger facilitation. As has so often happened in our industry, the pendulum seems once again be starting to swing the other way. The opening salvo was the recent US Department of Homeland Security Inspector General Red Team report, which, if you're not familiar with it, shared the unclassified results of running 70 covert tests through different US checkpoints to see how well the system was able to find them. The answer: very poorly. While modelling the end-to-end detection of various checkpoint configurations during the original IATA Checkpoint of the Future (the initiator of Risk Based Screening and PreCheck) development, we predicted

that the checkpoint process would be able to find somewhere between 17% and 31% of the broad threat range out there (guns, knives and explosives). It turns out that we were wildly optimistic, at least with respect to the US. The recent IG report and subsequent testimony by the latest TSA leadership to the US Congress shows that there is still much work to do to achieve not just a cost- and operationally effective security system but also some measure of basic effectiveness for the billions of dollars spent.

The second salvo aimed at aviation was the destruction of MetroJet 9268 in Sharm el-Sheikh, which is increasingly looking like an act of sabotage. While the investigations are still ongoing as I write this, it appears that MetroJet 9268 is another illustration that technology alone, without well-established staffing, training, operations and auditing programs will not address the challenges we face. Interestingly, another article appeared as I started writing this piece: namely that the Egyptian military had 'reverse engineered' the ADE 651, the divining rod of bomb detection that has been the subject of fraud trials in the UK for the past two years, and was using it to 'screen' checked bags at hotels.

As I was absorbing all this and discussing the situation with another consultant, I ended up going through an interesting, and worrying thought analysis. I thought I'd share it and use it to illustrate a point, even though it's likely to be controversial. So here goes. The US DHS Inspector General determined that the current TSA checkpoint had a missed detection rate of 95%. The ADE 651 has a missed detection rate of 100% of course; from a detection perspective it's worthless. However, if one were to combine the ADE with a behaviour detection officer aimed at observing the reaction of the passenger being screened and sending any passengers that behaved strangely to additional search, the overall process's detection would improve (at least it couldn't be worse) even though the ADE on its own is worthless. In the discussion, it prompted the question: could such a combined system actually be as effective as the TSA's measures from an end-to-end perspective? At least based on the Red Team results, it wouldn't have too far to go in that regard; a 5% end-to-end detection rate (combining behaviour detection with the ADE) would, mathematically at least, put it on par with all that technology and people deployed across the US (and potentially beyond). While this analysis is perhaps farfetched, it illustrates a point that the Checkpoint of the Future development team realised was important back in 2010-11 while working with IATA: the importance of both predicting and measuring the total system-wide performance of the security process, which is of course, what the Red Team (or any similar covert testing) does.

However, if you look through the various requirements for technology solutions coming out of TSA, DHS and the European Union, they are still focused on individual boxes - both from a development and from a testing perspective. The industry even has parlance for the maturity of these boxes: the Technology Readiness Level or TRL. TRL levels run from 1 (a bit more than a twinkle in someone's eye) to 9 (the manufacturers' Holy Grail: products ready to sell). However, as we've repeatedly seen over the years, there remains a disconnect between what the lab tests say the systems should be capable of detecting and what the covert testers actually find the process is capable of detecting. The recent IG report is nothing new; in my opinion, it does not reflect on the current crop of government regulators, managers, system developers or users as much as the underlying system we have in place, which falls short when it comes to developing and implementing truly effective security measures. Essentially we run the marathon but then stop a few hundred meters before the finishing line.

In discussions I've had with several industry and government colleagues over the past few months, I posed the basic question:

why do we 'stop' at TRL 9? Why is there not a 'TRL 10': the 'finish line', which I would define as a proven, capable end-to-end security process? Finally, how can we arrive there faster? Notice that I didn't use the oft-used term 'integrated'. To me, integration is one facet of an end-to-end process, but it is generally limited to technology. Rather, a TRL 10 could – and perhaps should - reflect the validation of technology, operators and CONOPs combined into a process. Of course it's easier (though as most manufacturers will admit, not easy) to test and certify individual boxes than it is to test complex combinations of systems – especially when they include operators and, in the case of the passenger screening checkpoint, parallel lines of bags and passengers, all of which need to be screened to similar standards to avoid giving terrorists a way to short circuit the process; something they've proven very adept at finding.

As part of the working team charged with organising the replacement for the popular, but sadly defunct, Gordon Research Conference on Illicit Substance Detection, we have discussed how to address all aspects of the security development process rather than just focusing on individual technologies at various stages of development. The conference (which incidentally will be called the Concealed Explosives Detection

Workshop and will be held at Downing College Cambridge, 19-24 September 2016) could be an ideal opportunity – in a mixed government-industry-academia setting – to explore not only emerging and maturing technologies, but also how to combine them into effective processes and validate their performance.

I believe we need to expand our thinking about such combinations and move away from merely having a lab-focused 'technology finishing line' consisting of a TSA or European CEP Certification that falls short of completing the marathon and has so far failed to deliver an effective end-to-end screening solution, at least at the passenger screening checkpoint. My manufacturing colleagues (maybe even my clients) may not approve of me saying this, but the Red Team test results and the real-world situation in Egypt are proof that the system we have in place is not yielding more effective security. Security paradise remains off in the distance, and in order to get closer to it, we need to adapt how we pursue security solutions. ISIS is showing us that we are likely to be

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entering into a more dangerous time for air travellers, making it time to reemphasise effective security. In my opinion, the key organisational challenge we face will be to become more efficient and reduce the time needed to get effective solutions into the field. ISIS has proven to be highly adaptable and creative. We need to step up our game in what is proving to be an ever more dangerous world. We're a long way from paradise. ■

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Steve Wolff is President of Wolff Consulting Services. He has 30 years experience developing and marketing advanced aviation security detection systems and was co-founder of InVision Technologies. He is co-inventor of several checkpoint integration patents and is consulting with companies and international organisations to promote new technologies and processes at the checkpoint.

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