

# Adding Gamification to the Training Syllabus for Fighter Jet Pilots

An Interview with Tim Davies, AERALIS Strategy Director



### Q: Tim, perhaps we should start by establishing what you mean by gamification?

A: Typically, what is meant by gamification is the application of game-design elements and concepts in non-game contexts. For us, specifically, it means using the gaming experience from other sectors to ensure that AERALIS is at the forefront of how to streamline and improve the complex and costly process of military flying training. Not only is that good for the students, it also means a reduction in overall training time and a tangible cost-saving benefit to the customer.

Whilst gamification will be part of training simulation, this is not about playing video games. This is about incentivising the training process whilst sharing the training experience and increasing interaction between students in order to improve the training outcome. We're very much interested in how this can help students not only develop more self-directed learning but also come up with their own ideas and methods for improving the process which future instructors will be able to use to make the training even better.

We believe this approach will enhance the work we are doing around ensuring that AERALIS will deliver a wholistic approach for ensuring the next generation of combat pilots develop the best mental and physical resilience needed for future warfighting.

### Q: It sounds like a very novel system, so how are you approaching it?

A: We are looking very seriously at what's happening in the growing gaming market where digital simulation and interactive experience between users is accelerating learning rates, especially amongst the younger generation who are already very much at home in this environment. We're also following what's being done in this area in the US, particularly with the latest United States Air Force pilot training programme which is looking at using gamed scenarios in virtual reality as a new way to train future pilots. In fact, a number of RAF students from the UK are there at the moment as is Air Officer Commanding No. 1 Group, Air Vice-Marshal Harvey Smyth, who is taking a very real interest in virtual reality and augmented reality systems.

To give an example, an element of gamification is the use of a 'digital twin' which represents the model warfighter that a student needs to emulate,

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and which the student then tries to match by working towards making their digital record of flying and combat performance equal to that of the twin. This digital record is then shared across the class so that students can contrast, compare and learn from each other's style to improve their own performance in the air. This provides a transparent way in which to incentivise students to not only work harder at their training, but teach both themselves and their instructors where they can re-focus and optimise their work in particular areas in order to maximised the probability that a student will complete the costly course successfully. Furthermore, the digital twin concept gives a training service provider anonymous data through which to compare not only student performance but also instructor performance and syllabus design across different courses and even different customers, meaning that for the first time a provider will have quantitative basis on which to develop better training systems in future.

## Q: I know AERALIS works with a number of the defence primes. Are you working with any of them on gamification?

A: As part of our partnership with Thales we're scoping out how the AERALIS common aircraft system will work with a Thales common cockpit simulator system, knitted together with an overarching information management system, and through this work up the most effective modular syllabus solutions for our customers taking as much advantage of all the available best-practice in training processes that we can, including the benefits of gamification. It's still early days as we need to understand not only the









benefits of gamification but also where best to pitch the live-flying training to compensate for any new or as yet unknown training constraints that gamification may introduce.

It means we're having to be very flexible and open-minded in how we approach this, including looking at how similar techniques have helped others in very different fields. For example, Jane McGonigal, a Senior Researcher at the US's Institute of the Future, published a book called 'Super Better' which takes a revolutionary approach to improving mental resilience based on her experiences of gamifying her convalescence from a serious head injury in order to accelerate the recovery process. Jane achieves this by using interaction through others in a game to recover her cognitive skills in a way that a conventional convalescence process could not have achieved. The key point here is that the process used the capacity of a controlled interactive experience with other users to increase the performance of an individual.

With such a capacity for helping users improve, we're looking at a system that can enhance a student's motivation to train and self-develop.

Such systems will include implementing a reward system which may include something as simple as a student's digital twin being allocated a unique characteristic or rank which competing students recognise as a sign of competency (an obvious parallel being the ranking system in a military organisation) and which creates a level of gratification that helps students enjoy their progress and strive to improve even further.

To reinforce this point, the thing we've found from our research is that by making training interactive across a group, if one student was doing badly, other students would go and help out that student, to help him or her improve because, although it's a competition, the critical thing is for the whole course class to get through successfully as quickly as possible. With such a capacity for helping users improve, we're looking at a system that can enhance a student's motivation to train and self-develop.



### **Q: Will the AERALIS training programme be bespoke for each student?**

A: In a sense, yes. That's one of the big advantages of gamification. If you incentivise the students to progress faster, any individual student may get to the point where we can say: "You're good enough now not to have to finish this particular phase of the programme, you don't have to do the last two trips". And then we're saving the customer money by not having to put that student through every sortie in the course.

That bespoke approach will develop as we gather further anonymised data as an increased number of students progress through the programme.

It's all about creating an environment which will encourage people to play to their strengths. So, what we want to be able to say to our students is: "Let's use gamification in the training process to identify where your strengths are, then identify where we need to adapt the training so that we maximise the probability that you will excel and pass the course ". Each student will have different aptitudes for air combat, or ground attack, but we can now use the system to explore that and keep a structured way to re-configure their training rather than try to force them through what is typically a fixed and standard process.

#### Q: Is your new approach partly driven by changes in fighter jet technology?

**A:** Very definitely. Sixth generation flying, the flying needed to operate aircraft that will follow the current leading-edge combat aircraft such as F35 is going to be very different from the generations that came before. For many reasons, fully automated aerial warfare is always going to be problematic, so it will still be important there is someone there to control and pilot future









combat aircraft, which is why we're very much about developing AERALIS with the world's best trainer aircraft at its core to give students the best live flying they need to perform in the world of future air combat. However as technology continues to reduce the traditional 'pilot' workload, the focus of the pilot's role will shift increasingly towards data processing, mission management, and battle space management, and how you're able to interact with data from not only your own aircraft but also from other combat assets in order to achieve the mission. For example, pilots aren't necessarily going to be engaging in visual air combat, it's going to be increasingly beyond visual range as we use swarms of armed drones or remote carriers controlled by a single aircraft to defeat a target, which means that the pilot's main job will be controlling an army of loyal 'wingmen', which she can't see because they're so far away. There's going to be a lot of data coming in from many different sensors on the aircraft and from ground, satellite or naval assets so everybody is going to be passing everything back to everyone else. The sixth generation pilot is going to have to decipher all that data and act on it. You can now see why gamifying the training process to prepare students for this future is so important.

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To support this, we're making sure we take a different approach to developing AERALIS. In the past, what has traditionally happened is that when fighter jets have been designed, the approach has been to start with what was already an aerodynamically high-performance aircraft and then add a bit extra, a bit more on top. But what we're saying is, "we're going to start with the individual first, and we're going to start with what sixth generation war fighting in the future is going to be; we're going to marry up the ability to train pilots differently using gamification, with the world's best training aircraft platform, and we're going to build something completely different." And this is where the beauty of AERALIS comes into its own as we are able to bring the strengths of all our key partners to achieve this outcome.

### Q: So, how would you sum up the AERALIS pilot training system?

A: I think the key point is that the AERALIS approach is all about offering all the flexibility an Air Force needs in order to train pilots to slot into the future of more digitised systems for air combat. Using techniques like gamification, our training system will be able to create the most effective environment for students to learn the skills they need whilst reducing cost for the customer, and on the back of this be able to take the data from both the students and instructors involved in a gamified process so that it's always going to get better, and by getting better it's going to get more robust and become more efficient.

Our unique modular designed training aircraft are scheduled to get airborne in 2022 so, at the moment, we're focusing on doing the groundwork on how gamification can help us, from understanding fundamental research to discussions with psychologists.

Our ultimate aim through all of this is to keep people in their 'max-learning' zone for as long as possible, and that comes when we are able to increase the efficacy of their performance by using gamification in parallel with live flying to create environments which absorb and incentivise students to perform and improve using a route they can control to some extent in order to get the best result from the course that can be compared to conventional flying training, this will be a new paradigm.

It's still early days as we need to understand how to best exploit the benefits of gamification, whilst minimising any new or as yet unknown training constraints that might arise, in order to deliver the most cost effective balance of live versus synthetic training.



