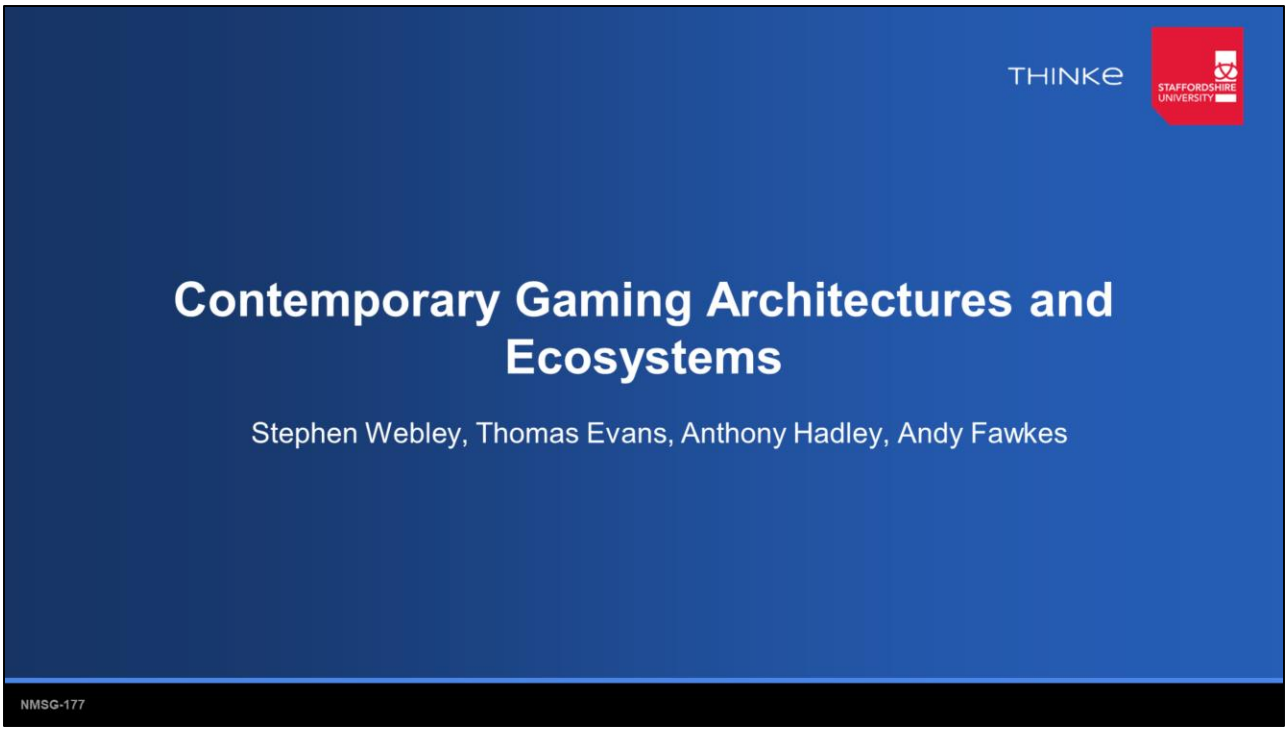


Hi, thanks for the opportunity to present today, I'm tom evans, I'm a masters student at staffordshire university studying ideology in serious games and with me is Anthony Hadley, a PhD student also from staffordshire university researching scenario training for disaster management, and Andy Fawkes (from the simulation & training industry). Unfortunately our co-author Steve Webley, who lectures at Staffs in military philosophy and game design, couldn't be with us today.

The aim of this presentation is to briefly highlight some of the developments in modern video games that we think are of interest to a military simulation and training audience.

Current and Future Trends

- Global gaming market is growing
  - Estimated revenues of **$159.3Bn** for 2020 [1]
- Market trends towards Games as a service and cross-platform play
  - Increased focus on data analysis
  - Drive towards persistent worlds/data
  - Improvements to delivery through Cloud/5G
  - Advancements in AI
- **2.7 Billion** gamers, and growing
  - Estimated to reach 3 billion by 2023

[1] newzoo.com/insights/articles/newzoo-games-market-numbers-revenues-and-audience-2020-2023/

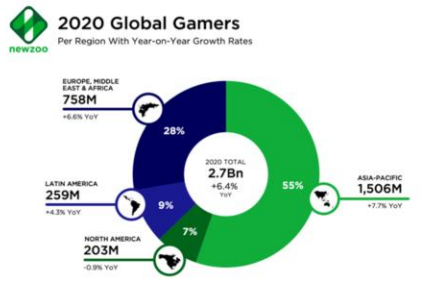


Image credit: newzoo.com

Number of active video gamers worldwide from 2015 to 2023
(in millions)

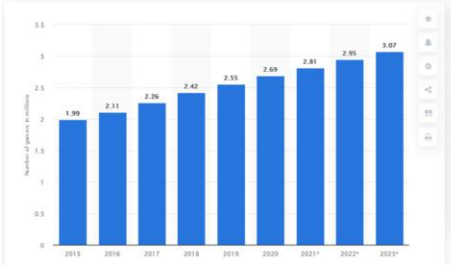
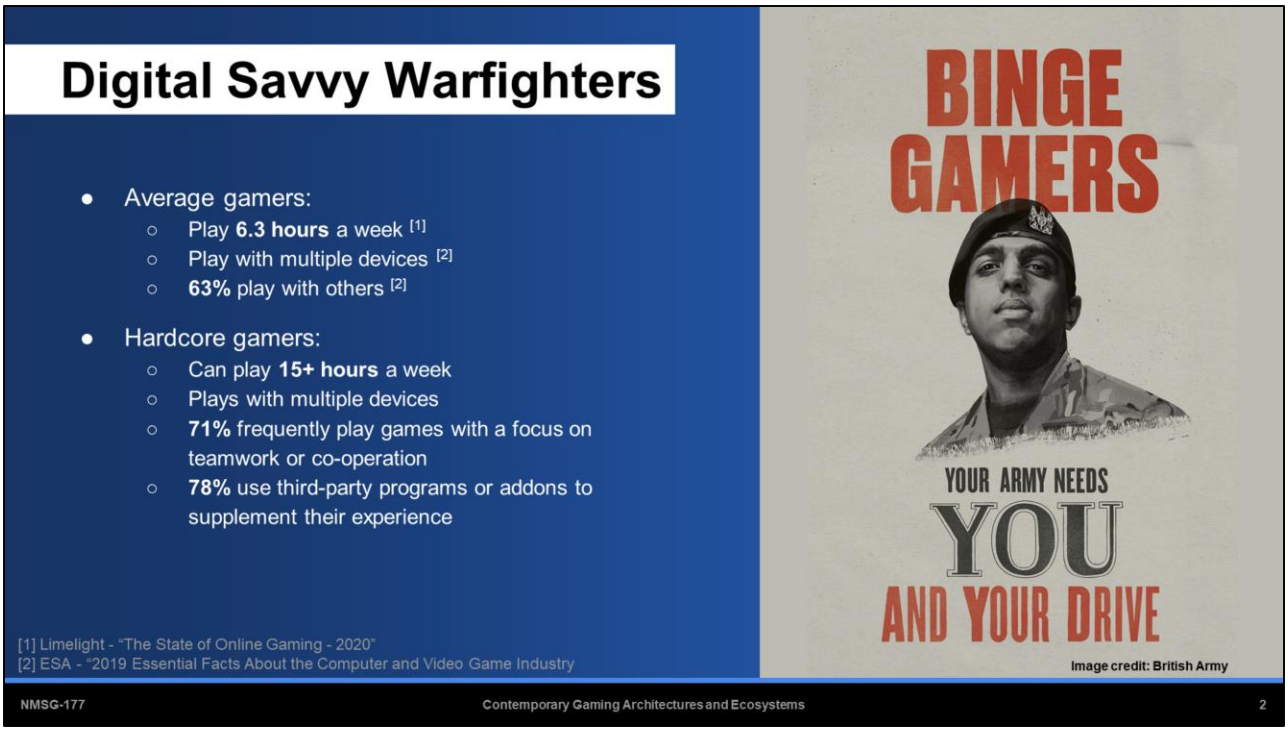


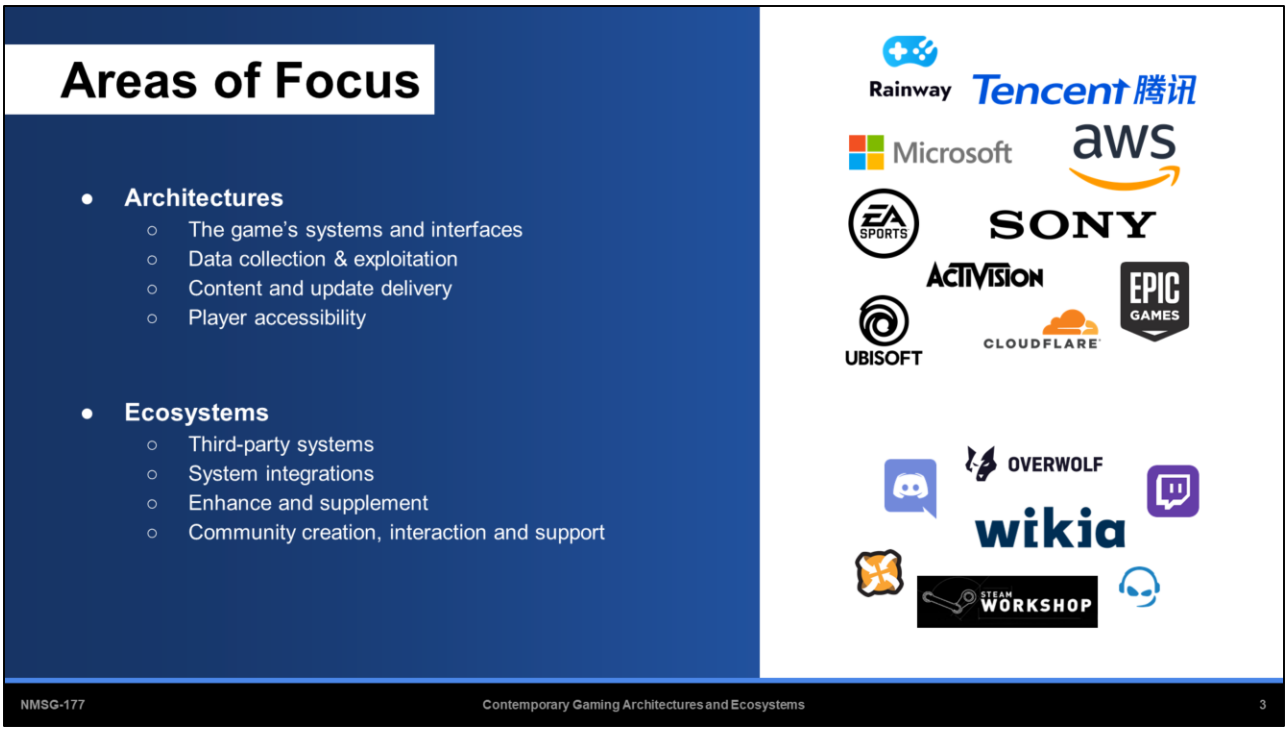
Image credit: statista.com

The games industry is staggeringly huge and continually growing, with estimated revenues regularly exceeding twice the combined total of the film and music industries. But within this giant industry, today we want to focus firstly on user familiarity with and knowledge of gaming systems, and then go on to highlight a number of technological trends and industry standards that militaries could draw upon

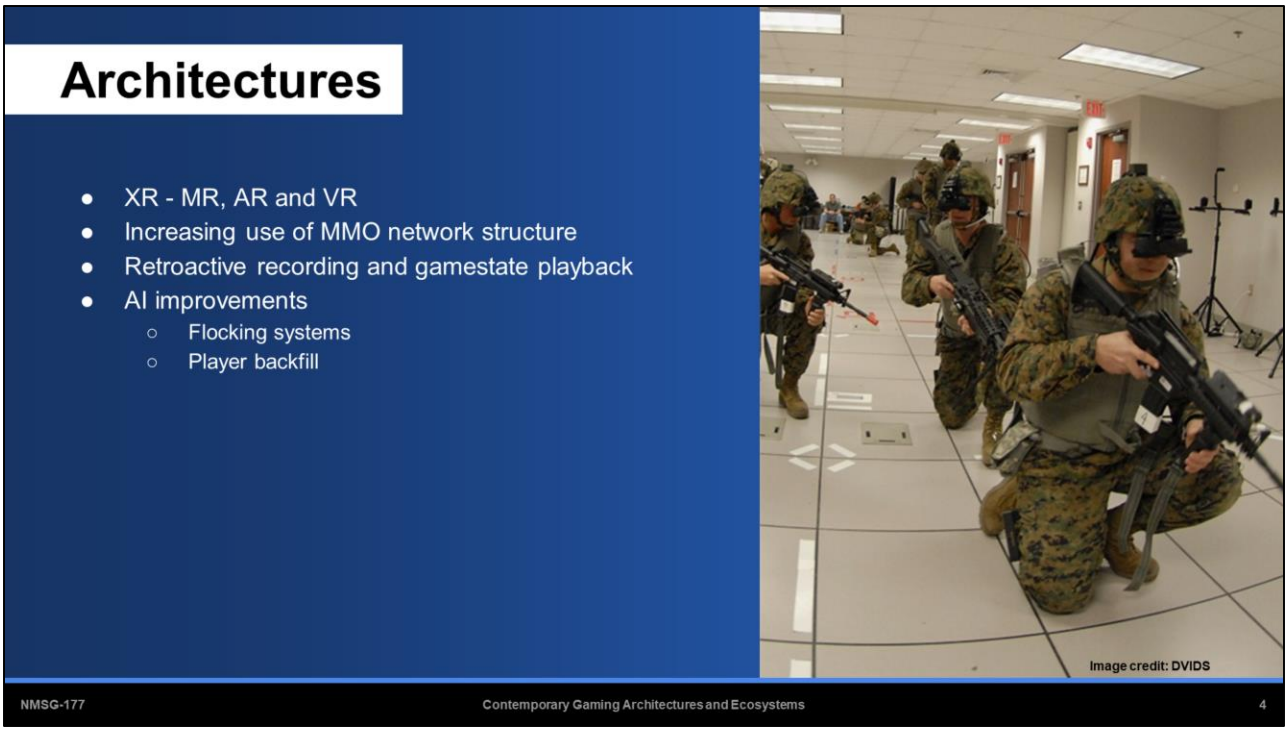


In comparison to some existing research done by the ESA and Limelight that found that the average gamer plays a little over 6 hours a week, our own survey of both enrolled and recently graduated university students shows that in some groups that average can be over twice that amongst the more hardcore players. But from that what you should really takeaway is that not only will the next generation of warfighters will digital natives, but it's quite likely that they will be gamers as well, and so will carry into their service many hundreds or thousands of hours of experience with these systems.

I'll not hand you over to Anthony to talk about our 2 main areas of focus
handover



In brief, we're here to discuss two areas of the gaming industry; architectures and ecosystems. The former are systems and infrastructure involved in delivering content from developer to user; the game itself, delivery systems and input methods. The latter comprises systems involved with enhancing user experience beyond the game, including community content, third-party addons, and integration frameworks. Recent developments are starting to blur the line between the two, opening up a wide range of possibilities of considerable interest.



In recent years, content delivery and user data applications have developed rapidly. Amongst these, four in particular seem of interest.

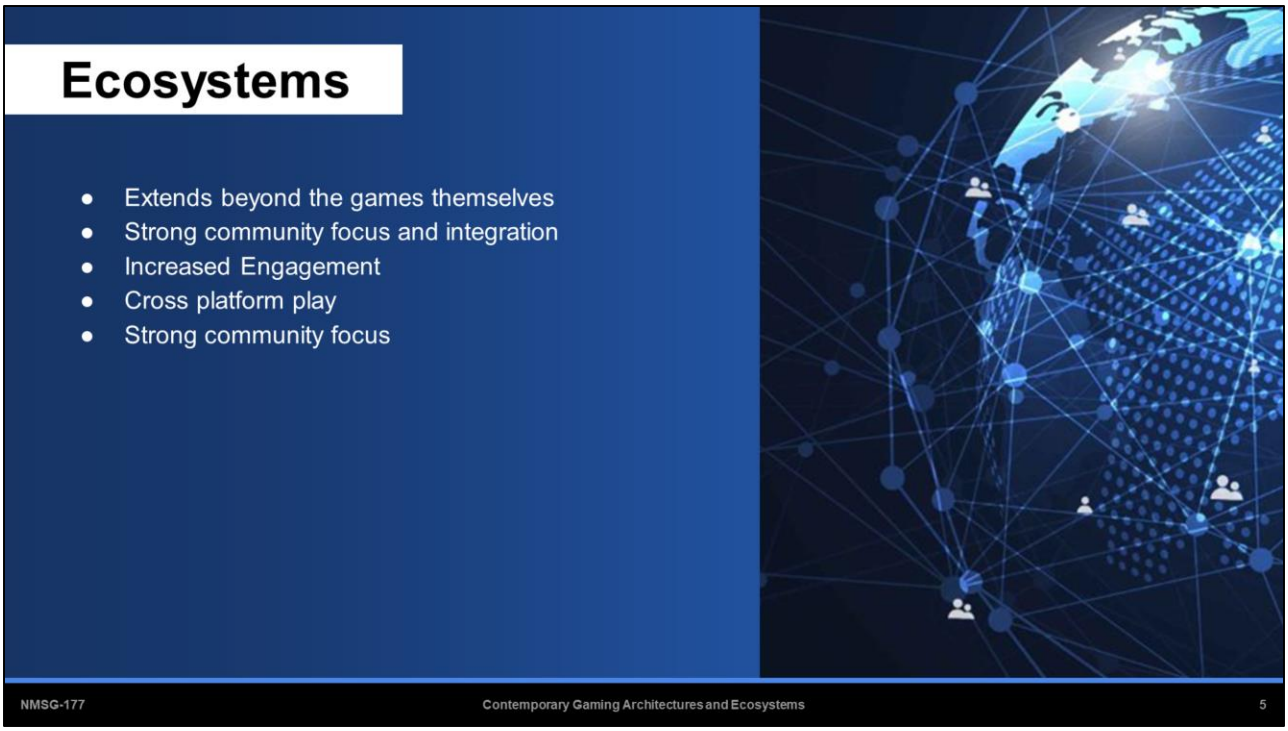
Extended reality - mixed reality, augmented reality and virtual reality - combine digital elements with physical-world measures to provide greater immersion and improved realism, allowing trainees to more accurately experience the situation they are training for.

Massively multiplayer network structures allow a greater number of trainees to be involved in a single scenario, combining multiple physical-world locations to form a single virtual one - several separate multinational battalions operating in the same theater, for example.

Retroactive recording and playback, which keeps a rolling recording of configurable length, allow organisers to save an instant replay without the need to devote resources to recording an entire exercise.

AI improvements provide two main benefits; flocking systems, typically used for birds and swarms, use principles also applicable to crowds - current advancements in flocking AI allow crowd simulations to be larger and more accurate. Other accuracy improvements like dynamic learning allow AI to more accurately replicate individual users, allowing participants to be partnered with AI almost indistinguishable from other trainees.

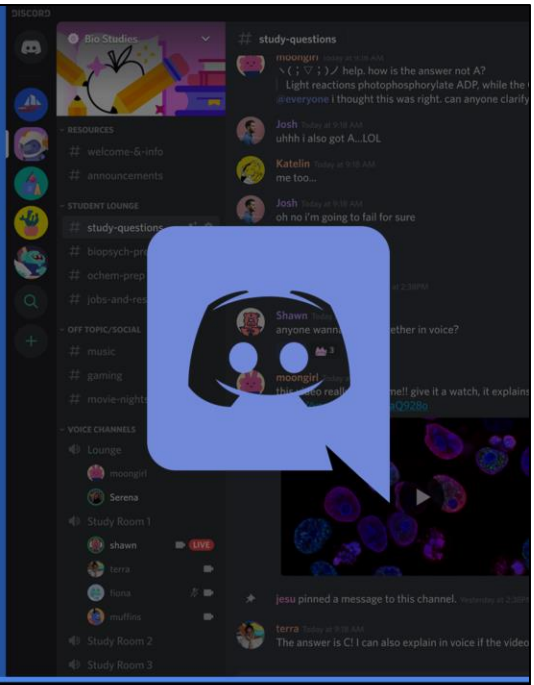
Here I'm going to hand back over to Tom to discuss the ecosystems that surround gaming.



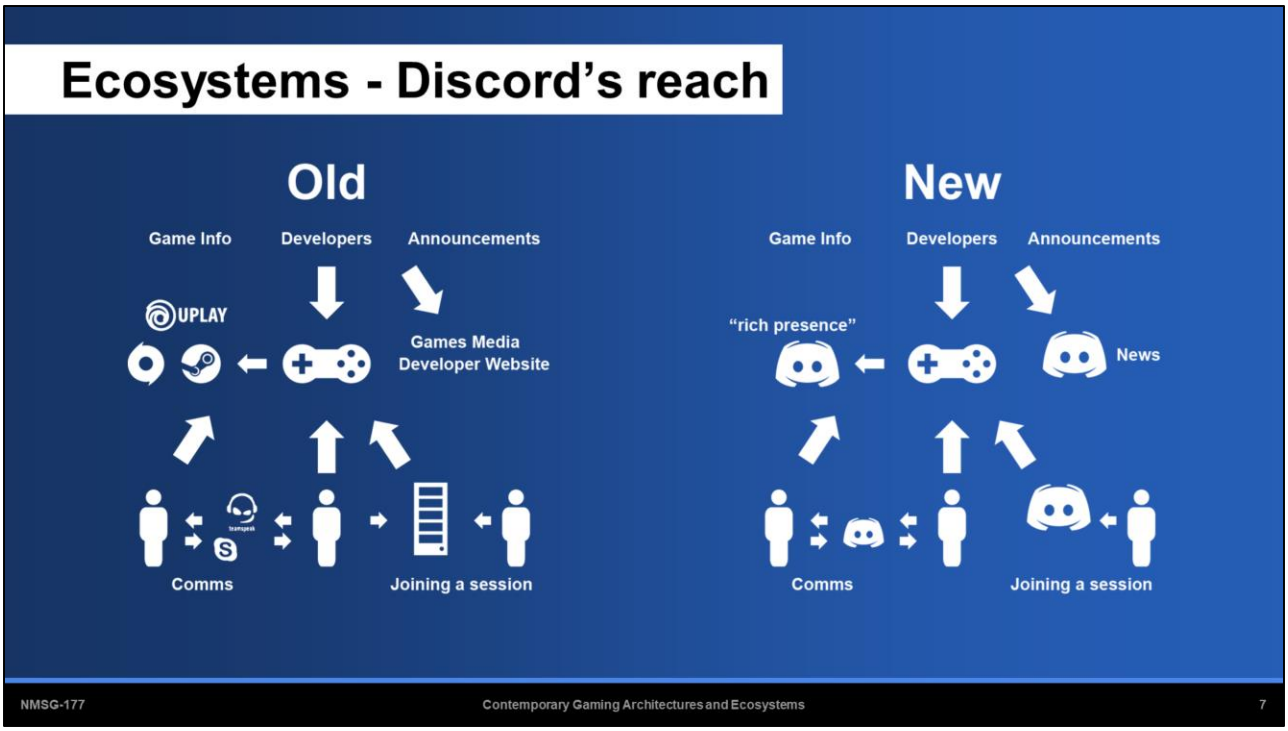
Which brings us on to ecosystems, an often overlooked, but nonetheless vital aspect of the modern gaming experience. Today, the relationship between the player and how they experience their games frequently extends beyond just the games themselves, as third-party programs, community forums, and crowdsourced content, have begun to either greatly supplement or in some cases entirely replace their in-game or official counterparts.

Ecosystems - Discord

- Free, Customisable, Lightweight
- Strong community focus
- Direct line from developer to community
- Tools to support community formation and moderation
- Integration into existing systems for reduced friction
- Extends the players interaction with the game beyond their play



A good example of this can be found in Discord. Like skype or microsoft teams, when it was originally launched it was as just a instant messaging client, but since then they have added various features that have helped the service to become used more and more for functions other than just communications, things like the ability to see the current game state, and join the session of other users regardless of the platform they're on have majorly reduced some of the frictions that just a few years ago used to be a fact of computer gaming.



While discord is but one program, it is a prime example of one of the ways the gaming industry in recent years has drastically streamlined and improved the experience of the end user, by allowing users to more easily communicate and connect outside of the games without drastically changing the primary systems (the games) themselves.

For nearly two decades the nato modelling and simulation group or NMSG has explored computer games technology and its potential to support the military.

Much of this work has looked at the games themselves but our study as shown that the games industry is now much more than the games, it is a growing and evolving ecosystem that has great depth and breadth.

So, First Bullet - The new generation of warfighter are digital natives and they are gamers and they should expect and deserve to have an experience with simulation that mirrors their gaming experience at home.

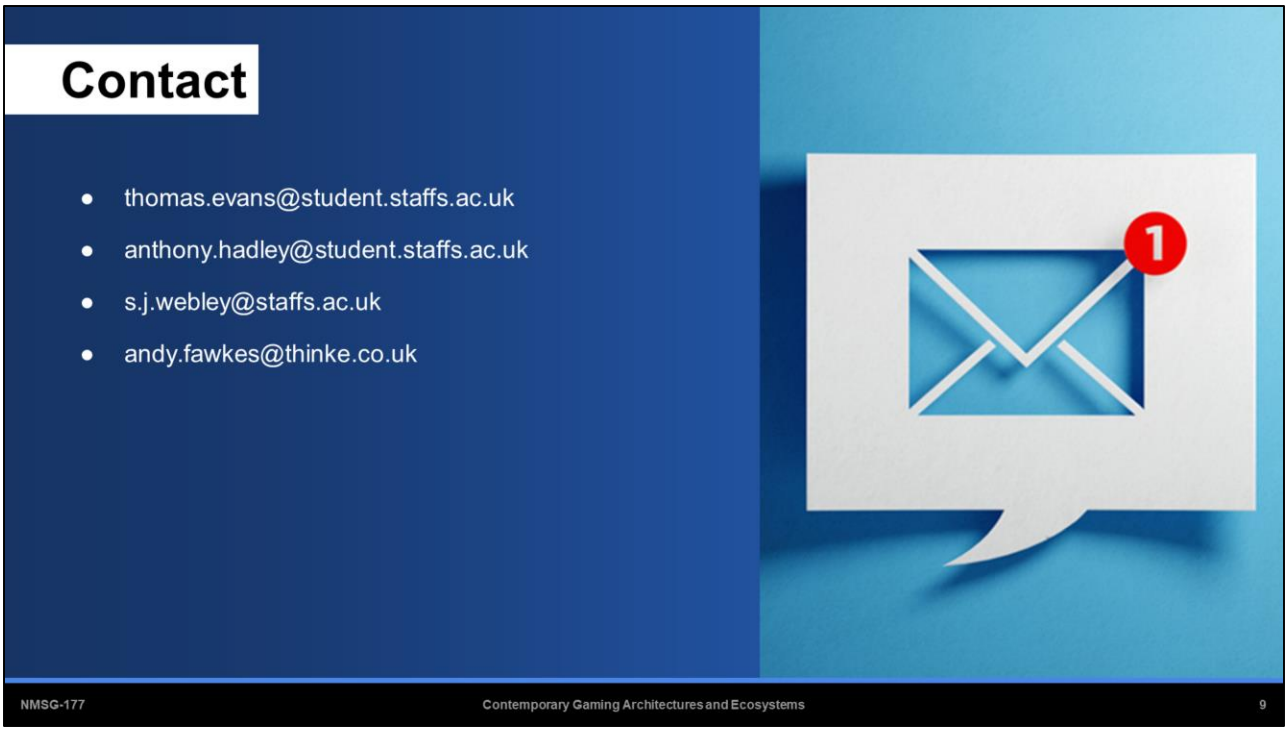
Second Bullet - They can access a gaming ecosystem that is becoming increasingly more personalised, easy to access, discoverable, seamless and interoperable, and that is in spite of the very many companies involved in the business.

We are moving towards a metaverse, with the pandemic accelerating digital transformation.

There is hence much to learn in terms of delivering modelling and simulation as a service especially from the user experience viewpoint.

Third Bullet - We are seeing games spawning communities where people meet, share, watch and learn. Warfighters in our view should be equipped and empowered in the same way to learn, train, rehearse and innovate, individually and collectively.

NEXT SLIDE PLEASE



Thank you for the opportunity to share our findings and we hope that the NMSG will continue to explore gaming ecosystems and their implications for the military going forward.

Finally I would like to thank Tom and Ant for giving up their own time to work on this study and for Staffordshire University and Steve Webley's support throughout.

We would be happy to answer questions either now or after the Symposium.