

Why Are Games Important for Defence & Training – NATO Overview

Mr. Stuart Armstrong
12565 Research Parkway, Suite 350
Orlando FL, 32826
USA

Stuart.armstrong@qinetiq.com

ABSTRACT

There has been a significant amount of interest around the use of Commercial Off The Shelf products to support military training and education. Over the last 10 years NATO has been hosting a series of workshops designed to share and expand knowledge amongst the members on the use of serious games. This paper summarises the workshop series since May 2009.

1.0 INTRODUCTION

The commercial sector is developing many of the key technologies and applications that have the potential for cost-effective adaptation for defense exploitation and use in modeling and simulation (M&S) applications such as defense planning, training, operations, and capabilities development. The exploitation of commercial technologies and appropriate use of open standards can provide efficiencies and increased benefits for defense applications. There is a need to identify those technologies having the greatest near-term potential, and understand the future trends and developments in those technologies that have potential, to meet future defense requirements.

“Facebook” and “World of Warcraft,” are now household titles. You don’t need to be a teenager to understand these technologies, or to exploit them in the defense domain. Market research indicates that many normal, middle-aged adults use these technologies with frequency. One can begin to see that these technologies are more than just entertainment. These technologies are already demonstrating how they impact the way we think, learn, and interact—and they are also demonstrating the tremendous potential they have in these areas as well. The emergence of social networking technologies and the evolution of digital games have helped shape the way in which people are communicating, collaborating, operating, and forming social constructs.

The newest generation of students is demonstrating the impact of having developed under the digital wave. Young people have been completely normalized by digital technologies—it is a fully integrated aspect of their lives. Many in this group are using new media and technologies to create new things in new ways, learn new things in new ways, and communicate in new ways with new people— behaviors that have become hardwired in their ways of thinking and operating in the world.

Simulations, digital gaming, and social networking technologies have all definitely suffered the same public relations problems that all new technologies experience. However, there are countless examples of these technologies demonstrating their educational value to other industries, confirming the powerful learning opportunities and advantages they afford. These technologies are safe, valuable tools that our learning institutions must take seriously.

Of course, changing instructional approaches is no easy task, particularly when technology is involved. Adopting and integrating technology-based instructional strategies has a long history of challenges, but with it has come a great understanding of how to achieve success with them.

2.0 NATO MODELLING & SIMULATION GROUP WORKSHOP INTO SERIOUS GAMES

The aim of the workshop series is to share national experiences, explore commercial and games technologies, understand best practices, and to identify barriers to further exploitation and ways these barriers might be overcome. In particular, the workshop series have investigated issues surrounding virtual worlds, serious games and similar technologies as they apply to using these technologies in military applications.

The workshop series has covered a variety of topics since 2009 including:

- MSG-074 Exploiting Commercial Technologies and Games for Use in NATO
 - May 09. Farnborough, GBR. Current technologies including virtual worlds.
- MSG-078 Exploiting Commercial Technologies and Games for Use in NATO
 - Sep 09. Suffolk, USA. Games standards, security, and VV&A.
- MSG-093 Exploiting Commercial Technologies and Games for Use in NATO
 - Oct 10. Rome, ITA. MMOG, augmented reality, mixed reality, and standards.
- MSG-108 Exploiting Commercial Technologies and Games for Use in NATO
 - Oct 11. Farnborough, GBR. Games, mash-ups, social networking and interoperability.
- MSG-113 Exploiting Commercial Technologies and Games for Use in NATO
 - Apr 12. Genoa, ITA. Immersive technologies.
- MSG-114 Exploiting Commercial Technologies and Games for Use in NATO
 - Nov 12. Oslo, NOR. Simulation and social media.

This paper draws on the major themes and conclusions drawn from each workshop as detailed in the workshop reports available from NATO ACT.

3.0 MSG-074 CURRENT TECHNOLOGIES INCLUDING VIRTUAL WORLDS.

MSG-074 was conducted 18-20 May 2009 at QinetiQ offices in Farnborough, United Kingdom. The workshop was attended by 35 invited ACT, NATO national representatives, and industry personnel participating in 15 presentations and demonstrations.

Presentations included:

- National Updates from NATO ACT, Norway, UK and France.
- Real Time Ray Tracing.

Based on the breadth of the presentations from both government and industry, it is clear that commercial games and associated technologies are not only applicable to military use, but already embedded in the activities of the NATO countries' militaries. Commercial games are clearly not just for training, but resident in other domains such as experimentation and analysis although training still receives the majority of the effort. Additionally, the primary underlying recurring themes were the richness of the environment and immersive qualities of games while the secondary underlying themes were non-kinetic aspects not just of the scenarios but also work that the games were supporting. MSG-074 was a levelling workshop on the individual efforts and applications of games in the military. Finally, the most important aspect of the workshop is the open collaboration and willingness to discuss difficult issues between the national representatives and industry partners.

VBS2 was undoubtedly the single biggest focus of this workshop, featuring in some way in almost every presentation or discussion which followed. In many ways it remains the pinnacle of success for the implementation and adoption of COTS based technology into the defence arena. However, this was purely down to luck, the adoption both by the United States Marine Corps and United Kingdom Ministry Of Defence was not done through careful selection, but simply by BISTudios being in the right place at the right time.

Are there other products and applications out there that would be ideal for adoption/conversion to military use that have simply not been lucky? Even if such products exist is there the mechanism available or the stomach to make such procurement, as that undertaken to obtain the VBS2 Gold License?

Will there ever be a time where high level decision makers expect COTS applications to be considered on an equal footing with the ‘big primes’? Although the investment in Microsoft ESP by the UK MOD, which seemed like a forward looking plan and a ‘safe bet’ may have given some of those decision-makers reason to sustain their doubts over the COTS market.

Licensing of COTS products will continue to be a topic of discussion and it will be interesting to see how the pricing of MOSBE (especially for the World Builder) affects take-up (within the UK MOD). Given the interest in the product by various institutions in the UK, the results in the study of MOSBE by Dstl will prove to be interesting.

Intermixed with the discussion over licensing costs is the continuing issue over proprietary over open source. While open source has its merits (cost not necessarily being one of them – given the potential cost of support) it is likely that, in the military context, certainly in the UK, that the feeling of security (real or false) that proprietary software offers means that open source is unlikely to be readily adopted in the foreseeable future. Such a predication, of course, is subject to future budgetary constraints.

4.0 MSG-078 GAMES STANDARDS, SECURITY, AND VV&A.

MSG-078 was conducted 22-24 September 2009 at the Virginia Modelling, Analysis, and Simulation Center in Suffolk, Virginia. The workshop was attended by 39 invited ACT, NATO national representatives, and industry personnel participating in 21 presentations and demonstrations concluding in an open panel discussion of high interest topics. The workshop was distributed via video teleconference and through the Second Life Virtual World for remote participants.

With the aim of the workshop to provide a venue to explore through demonstrations and presentations the “hard questions” related to exploiting commercial games and technology, to provide updates on the nations’ current application of commercial technologies, and to provide capability briefings and demonstrations of commercial technologies with immediate potential for use in a distributed manner through VTC, virtual worlds or other means then the workshop was a success. The only objective not met was to conduct a plug-up using a common multi-national scenario. Most of the hard questions, while asked throughout the workshop, were highlighted during the open panel discussion at the end. The open panel discussion was one of the most beneficial portions of the workshop as it provided the mechanism for the participants to begin to shape the “hard questions” into manageable topics for further discussion at future workshops.

It is clear that NATO nations are currently using commercial games and technologies, and based on the remarks from the group, there is a need and a desire to continue to pursue commercial games and technology solutions even given current procurement guidelines. NATO and ACT have the organizational infrastructure to facilitate these types of workshops and should continue them.

5.0 MSG-093 MMOG, AUGMENTED REALITY, MIXED REALITY, AND STANDARDS.

MSG-093 was conducted 2-4 November 2010 at the NATO Modelling and Simulation Centre of Excellence in Rome, Italy. The workshop was attended by 45 invited ACT, NATO national representatives, and industry personnel participating in 15 presentations and demonstrations. The workshop was distributed via Harmony Web for remote participants.

Presentations included:

- “The Experiential Based Learning Renaissance – Putting Serious Games and Virtual Worlds in their Places”
- “What Has NATO Been Doing?”
- “Intersections and Differences / Virtual Worlds and Serious Games”
- Virtual Reality Simulation for Disaster Response Training
- Virtual Worlds: the Real World Analogies”
- “Exploiting VBS2, Open Source, and Consumer Electronics for Research and Training”
- “NATO Implementation of Training Technologies”
- “Strategic Simulation Software”
- “VBS2 Technology on Thin and Mobile Devices”
- “Integrating Cultural Simulations into Virtual Worlds”
- “Virtual Worlds Architectural Framework”
- “Virtual Worlds: Next Steps for Interoperability”
- “Ground Truth – An Open Architecture to Support a Common Virtual World”

During the course of the workshop several themes or key issues arose sparking much discussion including:

- Definitions – Names are important, numerous times, presenters brought up the issue of what constitutes a virtual world and how should it be defined.
- 2D or 3D? – The group discussed, during several presentations, whether or not 3D was a required component of a virtual world or game to be immersive. It was agreed upon by the participants of the workshop, based on previous experience, that 3D is not always required.
- Persistence – Some in the community state that persistence is a required component of a virtual world. Many at the workshop disagreed with that particular statement.
- Contracting and Request for Proposal language – Related to the definitions issue, several presenters, both government and industry, highlighted that government RFPs may be limiting a potential valuable solution by specifically requiring a virtual world or a game.

The Workshop has extensive discussions regarding definitions of; serious games, virtual worlds, massive multiplayer online games. As an emerging suite of education and training technologies it is clear that these experiential-based learning tools should be simply categorized as immersive technology. That is to say that the participants are required to take on a particular role within a scenario that causes them to achieve a degree of presence that enables meaningful achievement of specific objectives.

There was a general consensus at the meeting that additional labels of the type listed above were artifacts based upon the need for vendors and early adopters to communicate meaningfully about initial capabilities

that have evolved significantly since they were first applied. It is likely that these terms will endure as they are imbedded in the names of some products and even organizations. However, it is agreed that the family of immersive technologies discussed during this workshop has considerable overlap in terms of their applications and as a result, using the initial classification scheme in requirements documentation is likely to artificially limit the ability of vendors to participate in the competitive process.

The workshop generated a sample requirements statement for use when defining immersive technology solutions:

“Using immersive technology running on this (type of computer system) provide experience-based training to allow trainees to demonstrate that they have achieved a specific level of language capability.”

6.0 MSG-108 GAMES, MASH-UPS, SOCIAL NETWORKING AND INTEROPERABILITY.

MSG-108 was conducted 25-28 October 2011 at the QinetiQ Facility in Farnborough England. The workshop was attended by 45 invited ACT, NATO national representatives, and industry personnel participating in 13 presentations concluding in discussion of high interest topics. The workshop was distributed via Harmony Web for remote participants.

Presentations included:

- Developing good-enough War-games and research on Gaming the game.
- Danish use of Commercial Games.
- The Battlefield 3 Effect: Do graphics matter for Serious Games?
- Next Generation LVC Architecture.

The commercial sector is developing many of the key technologies and applications that have the potential for cost-effective adaptation for defence exploitation and use in modelling and simulation (M&S) applications such as defence planning, training, operations and capabilities development the immediate focus is training. The exploitation of commercial technologies and appropriate use of open standards can provide efficiencies and increased benefits for defence applications. There is a need to identify those technologies having the greatest near term potential and understand the future trends and developments in those technologies that have potential to meet future defence requirements.

Past workshops have shown that there are a range of issues associated with employing commercial technologies. Attempts to focus on particular aspects of commercial technologies have not been particularly successful. Usually discussion of issues has resulted in briefings and discussions on individual research and progress in individual nations and industries. The result has concentrated on the near term lessons identified from the exploitation of these technologies and the organisers now wish to focus on a future vision.

With the aim of the workshop to provide a venue to explore through and develop a commercial games roadmap for NATO related to exploiting commercial games and technology, to provide updates on the nations' current application of commercial technologies, and to provide capability briefings and demonstrations of commercial technologies with immediate potential for use in a distributed manner through VTC, virtual worlds or other means then the workshop was a success. The only objective not met was to conduct a plug-up using a common multi-national scenario. Most of the hard questions, while asked throughout the workshop, were highlighted during the open panel discussion at the end. The open panel discussion was one of the most beneficial portions of the workshop as it provided the mechanism for the

participants to begin to shape the “hard questions” into manageable topics for further discussion at future workshops.

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7.0 MSG-113 IMMERSIVE TECHNOLOGIES.

MSG-113 convened from April 16-18, 2012 at the University of Genoa in Genoa Italy. The workshop was attended by 35 invited ACT, NATO national representatives, and industry representatives participating in 12 presentations and concluding in discussions of high interest topics.

Presentations included:

- Automated Intelligent Mentoring System
- SCORM the final frontier - delivering Immersive Training Simulations and rich performance data
- TODAY via your LMS
- Improving Immersion by Making NPCs Believable
- Gamified Information Systems: Toward an Efficient Delivery of Information
- Understanding Social Immersive Technology - Emerging frontiers for Training and Educational (T&E)
- Web 3D - Virtual Worlds - Interactive Simulations - Serious Gaming - 3D Learning
- How to Create A Dynamic & Destructible Simulation Environment
- Evolving Serious Games beyond Training
- Empowering the end user
- The Dutch Approach to Dismounted Soldier Training

The commercial and government sector is developing many of the key technologies and applications that have the potential for cost-effective adaptation for defense exploitation and use in modelling and simulation (M&S) applications such as Defence planning, training, operations, medical training, manufacturing and capabilities development. The exploitation of commercial and government technologies and appropriate use of open standards can provide efficiencies and increased benefits for NATO applications. There is a need to identify those technologies having the greatest near term potential and understand the future trends and developments in those technologies that have potential to meet future NATO requirements. The technological advancement caused by serious games now includes virtual worlds both of which may have a role to play in support of NATO countries and organizations.

Policy makers such as those at Allied Command Transformation sometimes wonder if the bottom-up implementation of these tools results in the best combination of technology and scalability to improve the effectiveness of operations, training, experimentation and concept development. There are two major challenges to overcome in ensuring the best use of technology and pedagogy. First, the contemporary operating environment is such that training requirements are inherently dynamic and moving fast. Second, there are many tools to choose from but they also are very dynamic and change shape as developers and trainers find new ways to use them. This workshop is intended to develop knowledge and improve understanding on how these tools can best be described, developed and applied in support of military training.

Through discussion and debate, attendees acquired knowledge and experience in the possible topic areas. Technical and application briefings and demonstrations on selected commercial technology areas will help the attendees better understand the issues so that they may more properly aid in the development of the strategy for the NATO and the Nations to exploit these technologies.

Participants and workshop organizers assessed this session of MSG-113 as a complete success. The workshop met its objectives:

- provide demonstrations and presentations to explore supportive of exploitation of commercial games and technologies as it relates to operations, training, experimentation and concept development
- provide updates on the nations' current application of commercial games and immersive and virtual capabilities
- provide capability briefings and technical interchange with NATO organizations and NATO partners on success and issues with the implementation of virtual and immersive commercial games within their organizations.

Development of the future of commercial games workshops persisted throughout the workshop and was the highlight of the closing discussions. A final discussion between the chairs and the technical evaluator and host proved to be a most beneficial element of the workshop. It provided the mechanism for participants to begin shaping the future workshops and will be discussed in greater detail in the conclusion section of the report.

MSG 113 showed that NATO partner nations use virtual and immersive technologies for training and experimentation. The workshop participants concluded that a need to continue pursuing these technologies is a must but more actions need to be taken in the validation of technologies, education of user's, and the evaluation of existing acquisition and procurement guidelines.

8.0 MSG-114 SIMULATION AND SOCIAL MEDIA.

MSG-114 convened 13-15 November 2012 in Kjeller (just outside of Oslo), Norway. The workshop was attended by 30 invited ACT, NATO national representatives, and industry representatives participating in 13 presentations and concluding in discussions of high interest topics.

Presentations include:

- Games and Transmedia in NATO and the Nations. Sharing and Moving Forward
- Transmedia
- Introduction to Havoc technologies
- Joint 2013" - Searching for New Military Learning Practices
- An online community model for NATO trainers
- Gamification in learning paradigms
- Update to Automated Intelligent Mentoring System
- VBS2 at the Norwegian Army Land Warfare Centre
- Mobile devices as an element in games and simulation
- Distributed simulations of realistic unmanned systems at FFI

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As with past workshops, this workshop facilitated the sharing of national experiences, exploration of commercial game technologies, understanding of best practices, and identification of barriers and solutions to further exploitation. Additionally, this workshop was reframed to focus on a future vision and began to articulate a technology road map for the exploitation of commercial game technologies.

The objectives of the workshop included:

- the background and affordances of simulations, digital games, and social networking;
- the cognitive implications of these technologies;
- specific challenges with using these tools for education and training, as well as strategies for overcoming these challenges in order to achieve successful learning experiences;
- the practical impact of these technologies in preparing warfighters;
- the practical impact of these technologies in educating support trades such as supply, transportation, and police; and
- the future of these technologies and their impact on learning and teaching.

The objective of this workshop was to share national experiences, explore commercial and games technologies, understand best practices, and to identify barriers to further exploitation and ways these might be overcome. In particular, this workshop dealt with digital gaming, and social networking technologies and the realities of their usage, as well as the challenges of interoperability.

During the course of the workshop, several themes or “hard questions” were identified including:

- Validation and Measures of the environments and how it’s making a difference
- Workshop intent and purpose – What will the NATO nations do to exploit new technologies and commercial games that they learn about at the workshop?
- Changing environment – The focus on the use or potential use of new technologies is changing, but how are the governments and industry going to adapt?
- Workshop plug-up – There is a desire for the government to see working demonstrations, and a desire for industry to meet a plug-up challenge.
- Use of trans-media in the development of content and leverage user developed content.
- Publish findings of workshops in formal conferences like IITSEC, SISO, and GAMETECH ETC.