Commercial Technologies and Games for Use in NATO – 12th Workshop

Technical Evaluator's Report

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Summary of Proceedings

1.0   PURPOSE:

The purpose of this Summary of Proceedings is to document the NATO Modelling & Simulation Group (NMSG) MSG-114 Workshop on Exploiting Commercial Games and Technology for Use in NATO. 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 helped 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. The workshop convened 13-15 November 2012 in Kjeller, Norway.

2.0   OBJECTIVE OF THE WORKSHOP:

- 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.

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.

3.0   WORKSHOP AGENDA

Tuesday November 13, 2012

1300	Administration	Meet at Kunnskapsbyen Conference Centre
1320	Chairmen	Welcome to FFI and Introductions
1345	Chairmen	Games and Transmedia in NATO and the Nations. Sharing and Moving Forward

1415	Dr. Elaine Raybourn	Transmedia
1500	Administration	Refreshment
1530	Kory Kumm	Havoc
1600	Chairmen	Daily Recap
1630	Daily Adieu	

Wednesday November 14th, 2012

0900	Welcome	Recap from Day 1
0910	Hilde Hafnor	Joint 2013" - Searching for New Military Learning Practices
0950	Coffee	
1020	Bruce Joy	An online community model for NATO trainers
1100	Mattia Crespi	Gamification in learning paradigms
1140	Dr. Johnny Garcia	Update to Automated Intelligent Mentoring System
1220	Lunch	
1330	Peter Morrison	Update on Bohemia
1410	Jan Eric Blix	VBS2 at the Norwegian Army Land Warfare Centre
1500	Coffee	
1530	Dr. Bard Reitan	Mobile devices as an element in games and simulation
1600	Dr. Lars Lovlie	Distributed simulations of realistic unmanned systems at FFI
1630	All	"Daily Recap Daily Adieu"

Thursday November 15th, 2012

0900	Welcome	Recap from Day 2
0910	CDR Sondergaard	NATO Education and e-learning
1000	Coffee	
1030	Stu Armstrong	Is Social gaming a Fad
1100	Chairmen and Host	Wrap-Up
1140	All	Adieu

4.0 PARTICIPANTS

<table>
<tr><td colspan="4">NATO UNCLASSIFIED

MSG-114 Commercial Technologies and Games for Use in NATO - 12th WS (Norway)</td></tr>
<tr><th>Name</th><th>Nation</th><th>Role</th><th>Attended</th></tr>
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<tr><td>BENTSEN Dan Helge (Mr)</td><td>Norway</td><td>Member</td><td>☐</td></tr>
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<tr><td>BIGG Colin (Mr)</td><td>United Kingdom</td><td>Guest</td><td>☐</td></tr>
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5.0 EXECUTIVE SUMMARY OF PRESENTATIONS:

Tuesday November 13th, 2012

5.1 Opening discussions and welcome by Hilde and introduction of the Norwegian Defence Research (FFI)

Ms. Hafnor discussed that FFI is the only major Defence R&D center for Norway that was established in 1946 and has 693 staff members.

Opening remarks by Stu Armstrong and Wayne Buck – Transmedia – what is it?

Mr. Buck and Mr. Armstrong gave an introduction and background of the serious games workshops. There were many new faces in the crowd and this background provided a good platform and baseline for all of the new attendees. Mr. Armstrong discussed the changes of technologies since 2007. Armstrong provided a video that shows social media and discussed whether social gaming is a fad from Socialnomics. Facebook, Twitter and YouTube are banned from MOD and DOD networks.

5.2 Wayne Buck and Stu Armstrong – Exploiting modeling and simulation to enable NATO transformation

Mr. Buck provided an update to the audience on ACT happenings and ACT's role as NATO's leading agent for change - driving, facilitating, and advocating continuous improvement of Alliance capabilities to maintain and enhance the military relevance and effectiveness of the Alliance as shown in Figure 1 below.
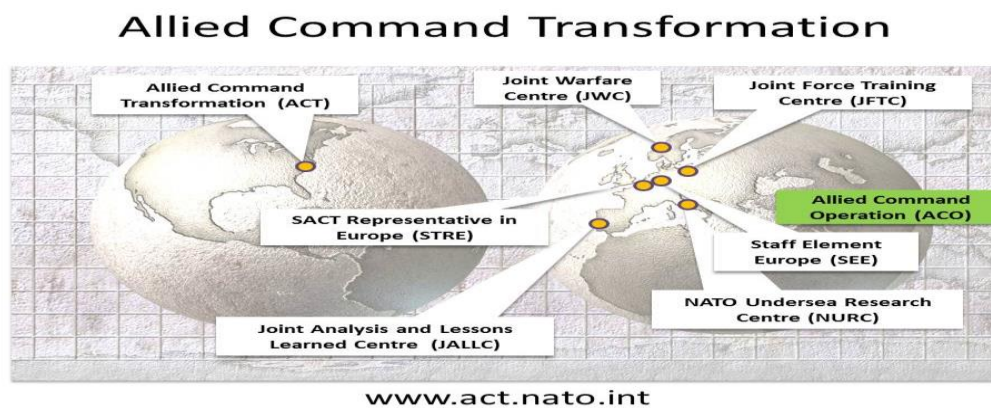

Figure 1: ACT as NATO's leading agent for change.

Mr. Buck further discussed NATO Requirements:

- NATO Defence Planning Process
  - High level and typically dealing with difficult/expensive solutions
- Concept Development and Experimentation process
  - Mid-level and typically dealing with already existing solutions being applied to NATO
- Cross domain solutions investigated under an R&D or other umbrella
  - Serious games

Mr. Buck further discussed the need for M&S outreach and sharing with ACT and NATO partners as it relates to serious games supported events in 2012 and beyond:

- Simulation in Support of Current NATO-Led Operations

- Computer Assisted Exercises Architecture

- Human Factors in Military Training

- Interoperability Requirements for Immersive Environments

- Exploiting Commercial Technologies and Games for Use in NATO

Mr. Buck provided a summary of the ACT investigation campaign in virtual worlds as shown in Figure 2 below.
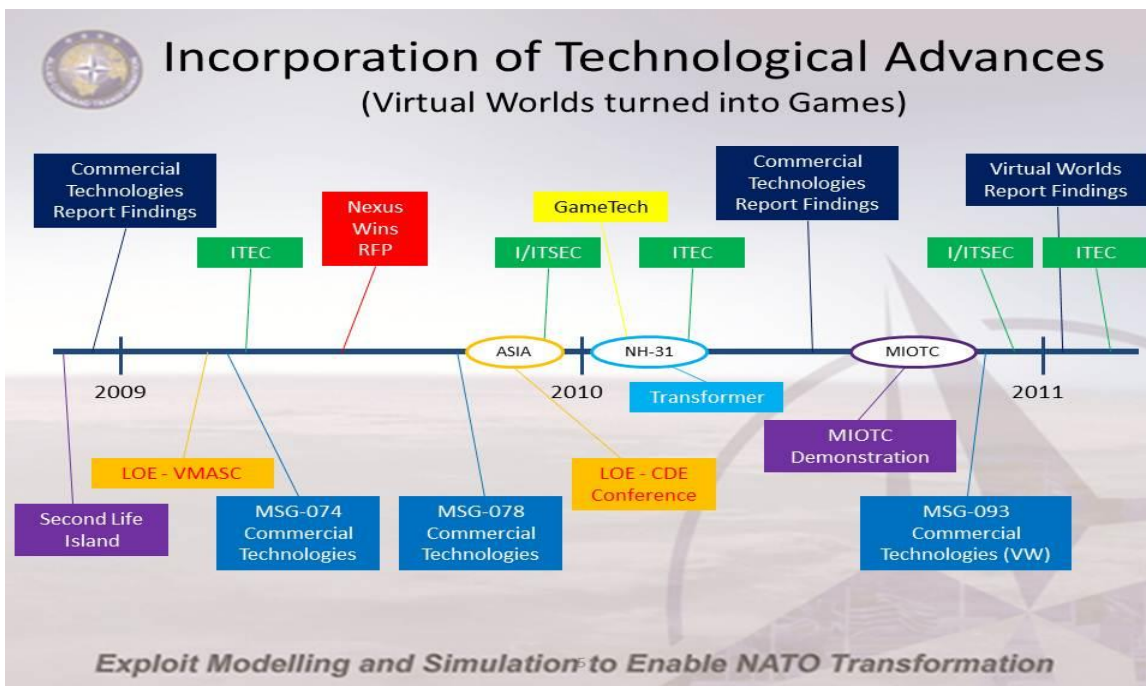
Figure 2: Virtual Worlds turned into Games

Mr. Buck presented virtual development of the HQ SACT and is investigating technologies that may be used to augment or replace existing technologies for education and training as well as capability development. One of the investigative streams is in virtual worlds as shown in the examples below. To the right and below are the entrance and foyer area of NH-31. Following are screenshots of some of the existing conference rooms. These conference rooms have been constructed in detail so that when staff uses them virtually for meetings, the surroundings will feel familiar.

Figure 3: Conference Rooms

Mr. Buck further discussed areas that are benefiting from serious games like:

- Meeting & Collaboration

- Rapid Prototyping

- Training & Education

- Skill building

- Data Visualization & Analysis

- Outreach

Mr. Buck provided background on the following workshops:

- 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.

He further discussed Village Survey, Virtual Worlds and Borders Ahoy as well as D54 Incorporation of Technological Advances through Modeling and Simulation with strategic decision making and training through games.

- Gaming technology / serious games
- Operational and strategic / political level
- NATO Defence College and ARRC
- Several Planned studies, workshops and demonstrations

Mr. Stu Armstrong provided a presentation on Research Areas that the United Kingdom is conducting as it relates to serious games, and gave a quick review of the following to increase technical maturity:
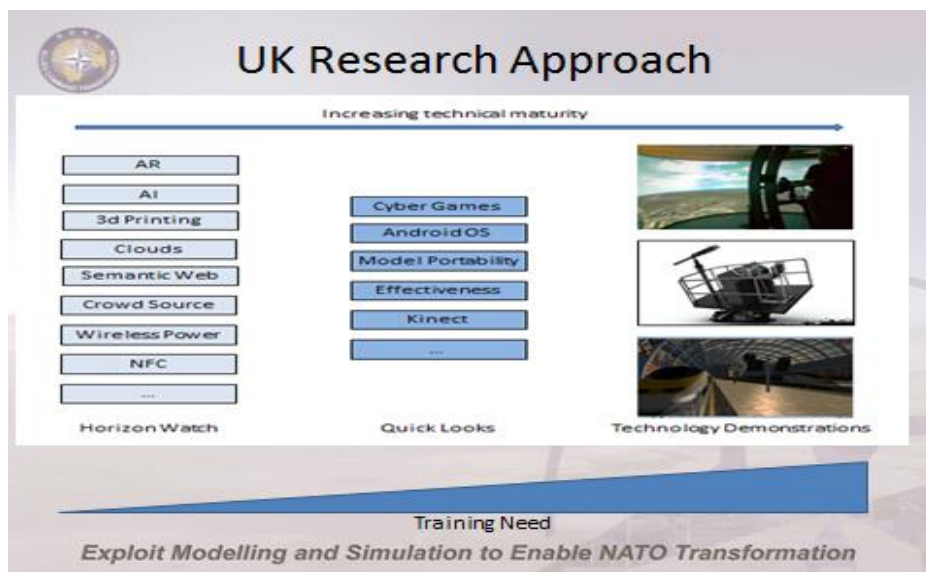

Figure 4: UK Research Approach –Increasing Technical Maturity

Here are some UK game technology examples:

Figure 5: UK Game Technology Examples

Figure 6: Gunnery Training Solutions

He gave more ideas on other capabilities within gaming as it relates to game theory, cultural training, and how to use training and transformation architectures. Mr. Armstrong further discussed the support of web enabled immersive environments like avatars levels of interoperability and training application for augmented reality – live fire against virtual targets. He also mentioned the need to purchase and leverage COTS products. He provided more examples of some simulation projects that focused on integration and interoperation. He further expressed the cost of these projects in the past and what the UK recently spent for these projects.

Figure 7: Niteworks Aviation Sim Project (AH64D)

Mr. Armstrong further gave a presentation on other uses of these types of applications outside of the military domain. He also discussed how they are using different games for use in these domains. It's all about cost and time on how gameplay can be used and understanding the limits of game play and the impacts as it relates to narratives of the game. He mentioned he is working on a paper for these findings.

Figure 8: Transportation Hub

5.3 Transmedia for effective training and Education: Elaine Raybourn PHD Research Scientist and National Laboratory Advisor ADL

Dr. Raybourn provided a brief introduction of Transmedia and Transmedia for military training as part of her research.

"A transmedia story unfolds across multiple media platforms with each new text making a distinctive and valuable contribution to the whole"

-Henry Jenkins, Convergence Culture

Quote from Mark Long, *GameTech 2011 Keynote,*

"We are in a transitional period where our relationship with media is shifting to multiple screens. Our audience is growing up in a digital world. The playing, reading patterns, and habits of young and old are changing as reading extends from the printed page to tablets and to a future of a myriad of diverse devices."

Why does the military need a transmedia framework?

Figure 9: Why we need a Transmedia Framework

She showed how to incorporate mobile devices in training. Without a framework nothing is cohesive and reinforcement is needed.

Dr. Raybourn is a big advocate of live action training – which has an emphasis of crucible training – that can be shifted when needed to. This enables learning. She showed a picture of the limbic system to illustrate how different portions of the brain work and how this is related to training.

Figure 10: The Limbic System of the brain

It showed characteristics of social process simulations. (Gredler, 1992)

Simulation experimentation design framework showed how to incorporate reinforcement for the training requirement. This allows for the creation of a Transmedia campaign where the trainee is the protagonist.
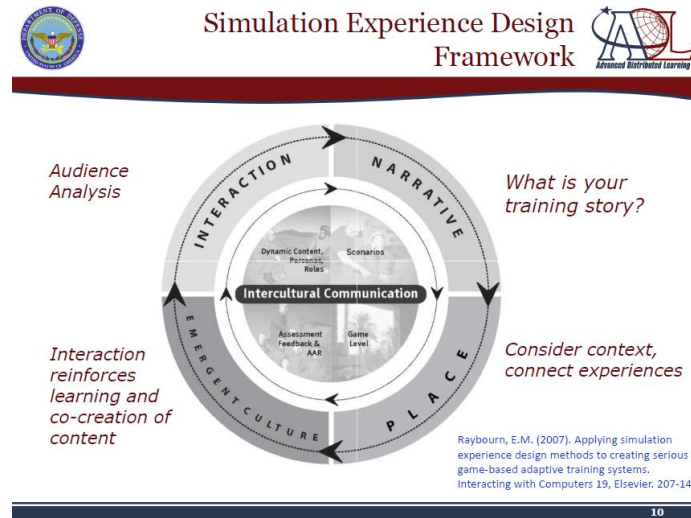
Figure 11: Simulation Experience Design Framework

She further described each quadrant of the graphic and gave an example of America's Army Game to help communicate what soldiering encompasses the use of social media as an advantage to the military

She also defined a transmedia universe as a means to create a campaign using social media and other content to draw the audience to imagine their backstories, side stories, and future stories shaped in large part by audience participation.

She provided a video of machinima – uses at TBOC showed the video of an IED explosion and how it affects the squad. One would notice them taking the aggression out on locals and how it affects their lives. She explained how the training can be affected and gave examples of a graphic novel and how it's being done for Training support packages as graphic novels using VBS 2.

She provided a recipe from Mark Long on transmedia and what is needed in figure 12 below.

Figure 12: Mark Long's List

She concluded with the possibilities of transmedia and how it can reinforce an idea even more.

5.4   Dynamic and Immersive 3D Training Technologies. Cory Kim HAVOC

Mr. Kumm gave a quick rundown of HAVOC - Cory started his presentation by mentioning that Havok is a wholly owned subsidiary of Intel ® Corporation and that it recently acquired Trinigy, a leading 3D game engine provider. The integration of Havok technologies with the Vision Engine is providing a powerful and customizable platform that enables teams of all sizes to deliver compelling content and experiences across multiple devices and operating systems. Steve discussed Havok's robust global customer support infrastructure and its business model that includes professional services and/or licensing through standard annual support & updates, and single or program-based deployment.

Cory referenced breakthrough AI in such games as LA Noire and how its behavior tool facilitates a custom character behavior tool in which discrete events can be prototyped, controlled and scripted. He further discussed HAVOK products and HAVOK partners. He described Havok vision engine features, Havok animations, HAVOK AI and Atmospheric blending, and Havok physics.

He then produced several live demos of Havok products including: Havok - Physics, Destruction, AI, Animation, Behavior and Cloth. He concluded by mentioning how it is working with partners such as Presagis, Terrasim, Calytrix, and Rocketbox amongst others to implement DIS/HLA interoperability and terrain generation.

See: www.havok.com and www.trinigy.net

5.5   Joint 2013'' - Searching for New Military Learning Practices. Hilde Hafnor

Ms. Hilde Hafnor –

Joint 2013's Aim: To develop the cadets' ability to think and reflect on the meanings and implications of modern military collaboration, communication and leadership by putting their experience and knowledge in a larger context.

This is done through:

- Exploring the effects of modern gaming and lightweight simulation technologies in combination with other social technologies;

- Addressing emerging types of military training/learning and experimentation areas that are usually not covered by highly advanced "traditional" M&S technology; and

- Training/Learning people-to-people (peer-to-peer) interactions with other humans to solve real problems in a highly complex and rapidly evolving environment

Practicing and learning face-to-face is not an option in the near future for Norway, yet semi exposure is possible.

Joint 2013 is:

- Learning about others- role playing the joint scenario; and

- Giving cadet's resources to understand how to address the modern conflict through shared cognitive frame of understanding – cross collaboration and cross-communication in a collective (together) state.

They discussed the research and educational approach as seen in Figures 13 and 14 below.
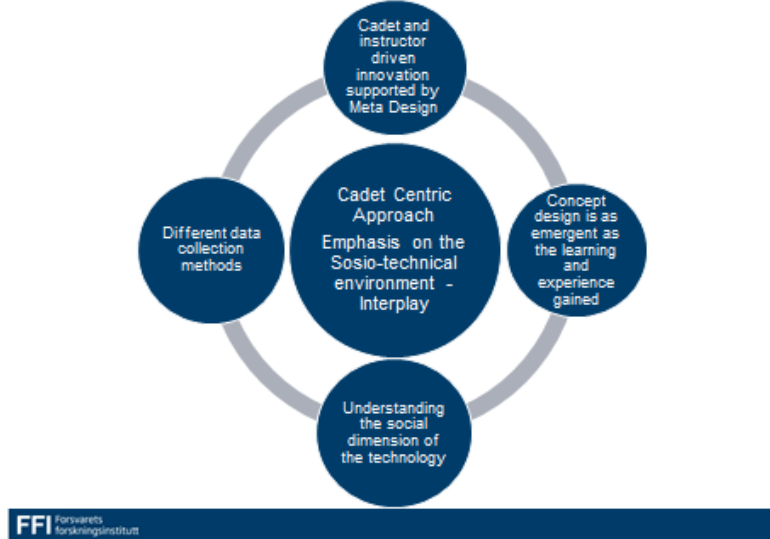
Research Approach - Summary

Figure 13: Research Approach – Summary

Educational Approach - Summary

Figure 14: Educational Approach – Summary

The concept of "Walk a mile in someone else's shoes" to experience and learn a situation from "the others" perspective was discussed with explanations of the virtual set-up.

There is also interest in web-based simulation (wargaming)

The cadets who went through the exercise felt they had learned something in a positive and new way. The advantages to this type of learning experience:

- Relatively simple

- Low cost

- No prior training needed

5.6 Mr. Bruce Joy and Marco Biagini - An Online Community of model for NATO Trainers (remotely done through Skype)

Mr. Joy gave a presentation on immersive technologies and how it is used to provide T&E environments for use in commercial and military applications. Integrating collaborative learning and immersive learning within a private online community of practice that focusses on critical thinking, effective collaboration as seen in Figure 15: NATO's e-Learning initiative as part of the NATO E-Learning requirements in accelerating culture change in NATO.

Figure 15: NATO's e-Learning initiative

He further discussed the concept and the online community of practice (COP) and the challenges and benefits of using COP by an example called SERMO; an online community exclusively for physicians and NURsim and train the trainer community prototype.

He discussed the approach of planning via immersive learning and uses of immersive media markup language (IMML) and the technical barriers of it.

1) managing and maintaining security
2) Lowering the barrier for wider participation

He discussed the uses of NATO future mission training network and the NATO network enabled capability (NNEC).

He summarized the used of domain specific communities of practice that show promise. And concluded with a quote from Aristotle: "Excellence is never an accident. It is always the result of high intention, sincere effort, and intelligent execution: It represents the wise choice of many alternatives".

5.7 Mattia Crespi Gamification in learning paradigms – How Gamification is evolving our learning models. (remotely done through Skype)

Mattia provided some questions he will try to answer

A new generation of users:

- grown up immersed in technology and the Internet
- different focus and different learning style
- learning style greatly influenced by videogames
- master massive collaborative games

His presentation proved that Engagement makes a difference. If learning is fun, they remember better and want to learn more. He also provided emotional incentives.

Emotion is the biggest driver – small steps towards motivation

Matrix of how motivation can be achieved is in Figure 16.

ACHIEVEMENT	SOCIAL	IMMERSION
• Advancement • Progress, power, accumulation, status	• Socializing • Casual chat, helping others, making friends	• Discovery • Exploration, lore, finding hidden things
• Mechanics • Numbers, optimization, templating, analysis	• Relationship • Personal, self-disclosure, find and give support	• Role-playing • Story line, character history, roles, fantasy
• Competition • Challenging others, provocation, domination	• Teamwork • Collaboration, groups, group achievements	• Customization • Appearances, accessories, style, color schemes
		• Escapism • Relax, escape from real life, avoid real life problems

Figure 16: Motivation can be achieved through…..

He stated that motivation can be achieved by a mix of these elements but it has to be kept simple and tied to rewards. He provided an example of how Gamification changed participation within a media   See Figure 17: How Gamification changed our participation with media.
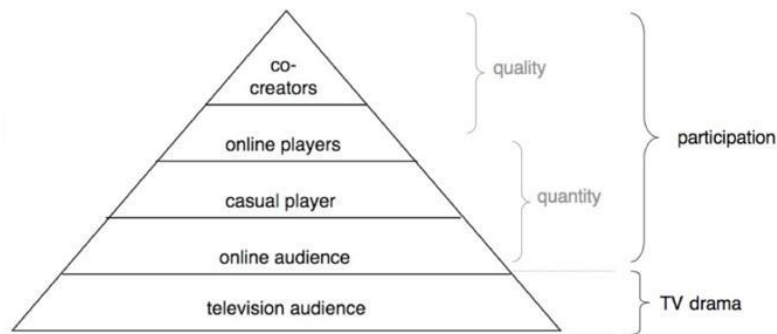
Figure 17: How Gamification changed our participation with media…..

Using leveling in games is vital to develop engagement.

A modern learning tool should be

1) Motivating
2) Simple

Serious games as knowledge incubators.

Collaborative serious games allow players to work together and allows for

1) Simple
2) Sociable
3) Symbiotic

He further discussed the future of learning.

He described a new sustainable model for learning.

He concluded:

- Participation has become a vital commodity that many organizations have not yet figured out how to capture.

- Many Learning projects fail to achieve the desired results, often because they are designed to capture attention rather than create engagement.

- Forward-looking organizations can seek out advantages by taking several key steps toward capturing engagement of learners.

Mr. Mattia Crespi provided the conference with a great presentation on the uses of virtual environments for risk training. His presentation gave examples of the new learning paradigms from books to tutorials and has the following benefits:

1) Safe environments
2) Creates unlimited hazards
3) Synchronous & collaborative training
4) Cheaper than real life
5) They can run on the web

He gave a context of the training as it would be executed in a construction yard for construction workers, architects, engineers and safety specialist to:

- Reduce training costs

- Raise courses participation

- Raise learning performance

- Enable new, more efficient learning methods

They used a mix of 2D learning tools with a 3D immersive environment to enhance the learning experience that was:

- Idiot proof

- Didn't force 3D; some things are better done in 2D

- Monitor responses and analytics

- Validate the simulation as a testing tool

The solution of this approach was a virtual construction yard that finds risks, evaluates risks and enables operators to respond and act on danger. It furthermore provides a risk free environment to simulate hazards and monitor data effectively for measuring learners' response. The part of the presentation that was a key factor to the success of this approach is how it was validated that he described in detail. They tested 800 learners; 400 in traditional approaches, and 400 in virtual environments, where:

- User tested on specific complex procedures with tests, after 30 days from the official test.

- 3D simulation learners scored on average 32% more than standard learners.

In conclusion, this presentation showed that the use of virtual construction yards saves time and money and is a good example for risk reduction enhancements.

5.8   Johnny Garcia An update on the Automated Intelligent Mentoring System (AIMS).

Dr. Garcia gave a presentation on the uses of gaming platforms to conduct for teaching and assessing procedural clinical skills. Unlike current simulation training models, our technology provides audio-based procedural instruction and active visual cues coupled with structured and supported feedback on the results of each session. This system greatly enhances the ability to support direct, standardized "expert" mentorship for health professionals as they learn and acquire new procedural clinical skills or are assessed in their proficiency in performing these skills.

Dr. Garcia further discussed the three-part aim for AIMS: satisfy the growing needs of Defence medical community, provide a product to attain procedural mastery and effectively improve skills, and increase interest in simplified methods of training by providing a smart return on investment. AIMS is leveraging patent pending technology to create an automated intelligent mentoring system, primarily a software package that addresses procedural training needs within the health care community. The basic plan is to design a cloud-based training system – Software as a Service (SaaS)—that provides live feedback and detailed comparison of the user's results with curriculum mandated standards. With feedback and unlimited opportunity to attempt the procedure, the learner can achieve the expected proficiency at their own pace. AIMS is a cost-effective way to eliminate inconsistencies in training methods and to reduce mounting demands on expert clinical educators. This is achieved through low cost hardware and a software subscription package from a custom, web-based environment.

AIMS provide healthcare professionals, students, and practitioners a way to learn and perfect key skills they need to attain course objectives, recertification, or skills maintenance. This technology enhances deliberate and repetitive practice necessary to achieve skill mastery, accelerates skill acquisition since supervision and scheduling are minimized, and provides uniformity in training and competency assessments.

Figure 18 below illustrates a template for user feedback. With feedback, the learner can repeat the task until achieving a measured level of proficiency. Without the need for supervision and allowing unlimited tries to reach proficiency, means that learners can proceed at their own pace of learning and fitting their own scheduling needs. All this is accomplished with little or no teacher supervision, taught in a uniform manner, and according to the individualized needs of the learner.
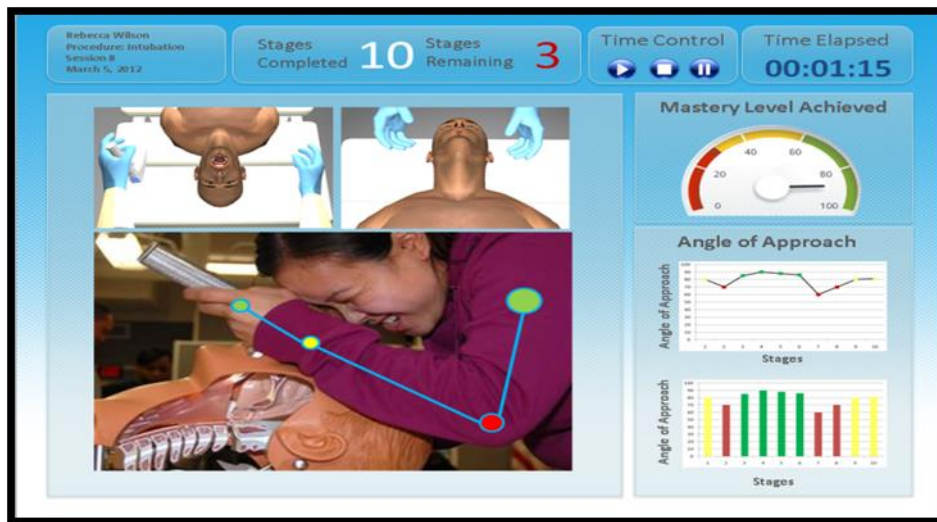

Figure 18: Perfecting skills through perfect practice.

In conclusion, Dr. Garcia's presentations showed how gaming technology can be perfected for teaching and assessing endotracheal intubation and potentially expand it to include a variety of additional procedures.

5.9 Mobile Devices as an element in games and simulations – Bard Reitan FFI

Dr. Reitan gave a presentation on mobile devices activities and described the mobile complex graphic. He mentioned the focus of FFI from advanced distributed learning to services and information available in military operations as a broad scope for research.

He provided us examples of the types of research he is conducting as it relates to availability of the devices to complement existing capabilities as shown below.

Figure 19: A different availability

Dr. Reitan further provided the focus areas of FFI:

- Increase the availability and quality of information/educational material/reference material or even digital/virtual arenas. E.g. for just in time learning or to include feedbacks in knowledge creation.

- Simple app generation, distribution and maintenance of apps.

- Military operations use-cases (communication, collaboration, sharing of information)

He showed us an article from 1991 that showed the use of hardware and software in 21st century and it hit hard that we are using these devices today. See figure 20.

Figure 20: The Computer for the 21st Century

He further mentioned the need for games and simulations to be in the background so that

- Services are delivered using a network and few requirements on the client.
- Mobile devices when:
    - you would like to carry the simulation/game with you,
    - a mobile device takes less effort,
    - you want to do a long-running game/simulation (in-between other tasks),
    - you would like fewer or no constraints on where the participants are located.

In summary he provided the complexity of mobile environment shown below as:

- Vast resources put into the mobile complex, something to take advantage of.
- The mobile complex may be utilized to make games/simulations more available:
    - Carry along the game/simulation or information produced therein.
    - Second terminal.
    - Long-running games/simulations. Participate in-between other tasks.
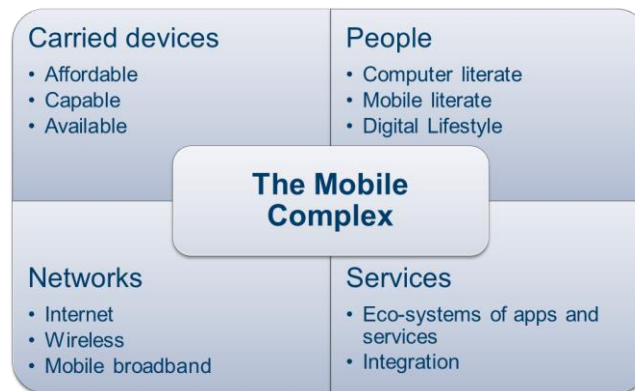   - Fewer or no constraints on participants location

Figure 21: the Mobile Complex

5.10 Games, virtual worlds and free to play and industry perspective – Pete Morrison Bohemia interactive.

Pete discussed the difference in games for entertainment and games for training as a basis to understand the users and the requirements of the environments. He provided an introduction of games, virtual worlds and the "free to play" concept. He provided a number of examples with a focus on what it all means for the military. Pete mentioned that for a game to be entertaining it requires immersive gameplay, but for a game to be effective in training, it needs to facilitate learning. The relationship between gameplay and learning is complex and is a big area of research. In Defence, we see a lack of education about the potential of games. He wants his focus, as CEO of Bohemia, on the fallacy that immersion requires high fidelity, for example photo-realistic graphics.

Pete gave many examples as part of his presentation:

- Virtual world – persistence or the illusion of persistence – gave an example of second life example (global love day)

- Gave an example of DAY Z – DayZ is a modification of our Arma II computer game, the game engine upon which VBS2 v2.0 was based. It is known as a "hardcore zombie survival sim". Players start with only a can of beans in a post-apocalyptic virtual environment, and the goal is simply to survive. Players must scavenge for supplies, hunt and cook animals and establish camps. Threats include hordes of zombies and most importantly the other players. DayZ went viral earlier this year and this has kept the underlying game, Arma II, very popular. It's a zombie survival game. He showed a video of zombie survival game. Avoid the zombies…

  - Each DayZ server supports either 60 or 100 players, and they all play on terrain that looks like this, 15km x 15km.

  - The only difference between DayZ and traditional virtual worlds is that login steps hidden from the player. The server is allocated automatically, and typically the player will be taken from the start screen directly into the game shown in figure below. But here's the trick: even in massively multiplayer games, there are very rarely actually *masses* of players interacting directly. Like the illusion of persistence, game developers are giving you an illusion of massively multiplayer, and there are many techniques used to trick the user into thinking they are playing alongside thousands of other people.
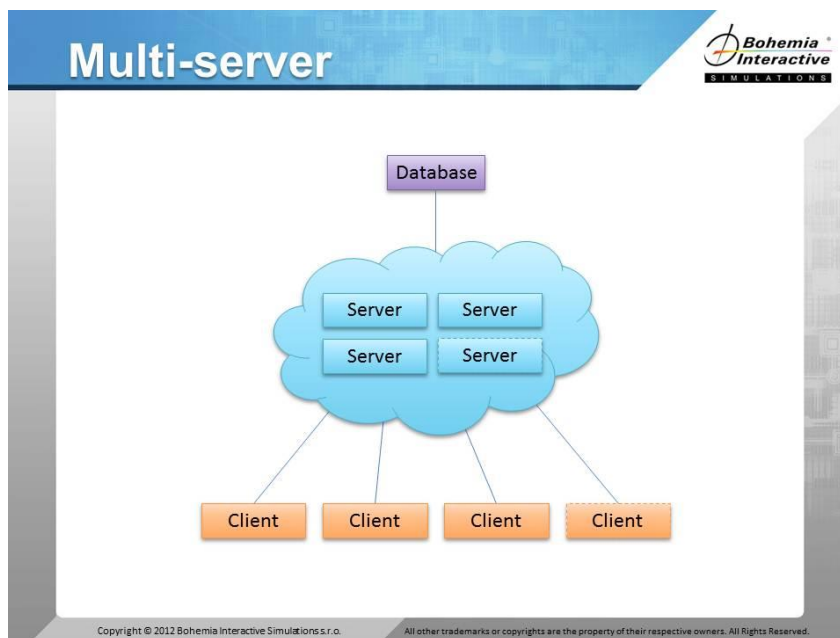
Figure 22: Multi-Server map

- Eve Online is a space combat game in which participants operate a ship (one ship per participant).

    - Eve Online maxes out at around 1500 on the one shard, and even this requires a range of interesting techniques including time dilation to support that many players. Time dilation simply slows everything down when the system is under load, to give the server more time to communicate with all the players and properly resolve the conflict. It works well in Eve because it is not twitch-based, but in first-person games like DayZ this technique will be less effective (it would be like playing in slow motion).

- The next example is Guild Wars 2. This is a very new MMO title released in August of this year. It is more traditional in its approach. Like World of Warcraft or Second Life, it splits it's territories up and distributes them amongst servers. Players will operate within these territories, a few hundred players at once on a single server. But – because you can skip to these different territories at will (and jump servers); it gives you this feeling that you are participating with thousands of other players, not just a few hundred. If a single territory gets overloaded, then the system just creates a new copy and puts the additional players on that. This is tried and tested load balancing for an MMO.

- Lastly, he talked about World of Tanks. He discussed it in greater detail later, but noted that this is an MMO that supports concurrency of tens of thousands of players, on server clusters in the US, Europe and Asia. The point to note at this stage is that this MMO only supports 15 x 15 players on 1km terrains!

Clearly, "massively multiplayer" simply refers to the number of players that connect to the server clusters, not the maximum number of players that can interact at once.

Pete used these examples to get a point across that Multi-server has been possible within the military using either HLA or DIS for many years, and filtering provides a crude form of load balancing. In his opinion, any game or simulation that supports multi-server, multi-player capability should be considered (and meets the definition of) a virtual world as shown in figure 23 below.
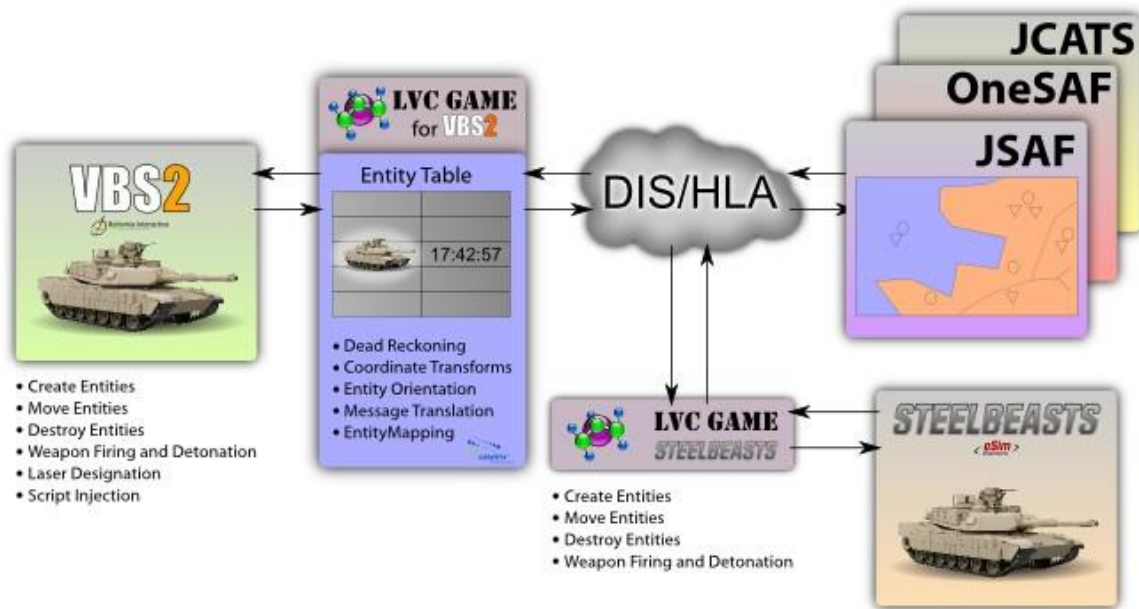
Figure 23: Considered Virtual World

He showed that virtual worlds are games that have a) the illusion of persistence, and b) the illusion of supporting thousands of players. Up until 2011, these distinctions were significant and games were categorized as being either massively multiplayer, or not. What we are seeing now, however, is an important change and it is due to the "free to play" concept.

"Free to play" has many variations, but at its heart it means "optional subscription fee". For many years, the big MMO games (such as Eve Online and World of Warcraft) all had monthly subscriptions and this further separated them from the traditional gaming business model (buying a box in a store). Over the past year or two, however, new games have begun to do away with subscription fees in order to compete and this trend is very important. Newer online games rely on the following primary sources of income:

1) Initial purchase fee, and/or
2) In-game (possibly micro) transactions

It should also be noted that the "always online" nature of these games help the developers control piracy.

One of the first and most successful free to play games is World of Tanks, which has no initial purchase fee and relies entirely on in-game transactions. World of Tanks involves 15 on 15 players, driving tanks, tank destroyers or artillery and trying to blow each other up. Interestingly it is still considered "massively multiplayer" but at any one time only 30 players are ever in the one game! World of Tanks is a classic rags-to-riches story for the developer, who was initially shunned by publishers around the globe and told that the business model wouldn't work. The developer, Wargaming.net, published the game itself and now makes a profit of tens of millions of dollars and (reportedly) has a concurrent user count similar to Second Life.

Guild Wars 2 is more akin to a virtual world than a single player game, but it is widely hailed as a possible successor to World of Warcraft, largely because it took everything that players disliked about WoW and built a whole new game that addresses all of these issues. Whereas WoW requires multiplayer cooperation, Guild Wars 2 simply encourages it, with a focus on fun rather than grinding up levels. The whole game is designed to be finished by a single player, which is unique for an MMO (usually they seek to encourage group play so there will be more subscribers). Guild Wars 2 has about a $70 initial cost but is free to play from there. The result is an intriguing experience.

His final example was Diablo 3. The Diablo series is a very popular series of top-down single player games, in which players battle though countless dungeons leveling up characters and fighting ever more difficult enemies. Diablo I and II were single player experiences only, but Diablo III is a single player experience with a significant online component. This online component does allow friends to play together, but also it allows players to trade (which is important for immersion), and also purchase new items with real money. The important point is that Diablo III, like any other MMO, is "always online", even though it really is focused on the single player experience.

Now what is interesting about Diablo is that it has a "Real Money Auction House", that allows players to trade in-game items for… real money.

Key Points he had provided so far

- "Persistence" is an illusion
  - Essentially saving and reloading player state
- "Massively" multiplayer != thousands playing together
  - Refers to the number that can connect to the server cluster, not the number that can interact at once within the game world
- Games with online components are becoming common
  - "Online virtual community" = "Virtual World"
  - Being online helps defeat piracy and allows in-game transactions
- All of the examples given are built on bespoke engines
  - There is no "best" game engine for a Virtual World!
- Players are happy to download huge data files (> 10GB)
  - Stand-alone executable are the accepted norm
  - The most popular virtual worlds are *not* browser-based

He concluded that:

- The distinction between games and virtual worlds is… [arguably] obsolete
- Both persistence and massively multiplayer are tricks to deliver a specific gameplay experience
  - Not difficult to implement, most game engines already support both
- We should consider GameTech streams based upon user requirement (tactical training, integration with simulators etc), instead of focusing on the technical
- Educate the customer!

  If you want to leverage game technology, don't
  ignore the trends in the game industry!

5.11 Exploring Commercial Games for use at NATO Use of VBS2 in Norwegian army – Gasvik Army

Brief topics were the use of VBS2 in the Norwegian Army

Explained how it was used during exercise and who are the users, the biggest user is the artillery and the warfare center, with the terrain being generated for the users. He also showed examples for fire area for utility of DTED and SHAPE files into the environment giving an example of the company commander course in the spring.

- Discussed the breakdown of the setup and the resources used for the environment.

- Gave discussion on experiences on the uses of tools.

- Dan provided more details of the KONGSBERG training system.

- Gave an architecture description of the training environment.

- Jan gave further data of the training capabilities and described how it's done in the Live and Virtual environments for this gave a demonstration of the game and where it was. He also gave more examples of the exercise control.

- Uses of the UAV

- Distributed Simulation of realistic unmanned systems at FFI – Dr. Lars Sundness

- Motivation – discussed the testing of the UAV

- Goal for the simulator

- Example applications –

  - Environmental

  - Topographical

  - Technical

  - Organizational

5.12 Recap of the day-Wayne Buck

Mr. Buck finished the day with a brief discussion of the great presentation of socializing the environment to operators and users. Some of these Examples were provided today.

He further mentioned the other trend on how different platforms interact in the uses of environments in Gamification, transmedia and general trends in gaming, like new technologies and mash-ups as shown by Dr. Garcia with AIMS. More questions came up and could become the focus on the next workshop.

1) The group further discussed the need for measures in the uses of these environments.
2) How do we create a distinction of learning and training?
3) Socialization – what are intuitive changes over time of these environments?

5.13 NATO E-learning –CDR Svein-Inge Sondergaard (RNoN) Joint Education, Training & Exercises Allied Command Transformation

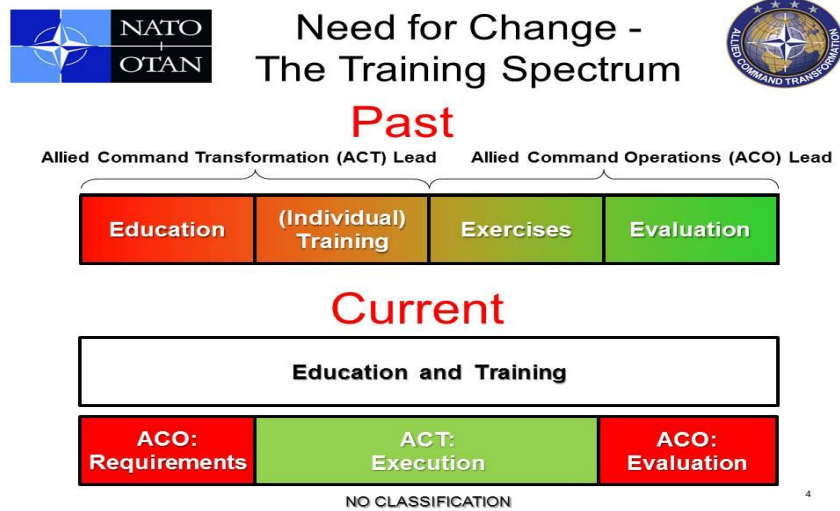CDR Sondergaard provided the need for change – the training spectrum has to evolve as shown in figure 24 below.

Figure 24: Need for Change – The Training Spectrum

He further discussed how the requirements of NATO Education and training intuitions has increased and leveraging gaming technology allows for more flexibility for the facilities to support centers of excellence and partners.

Figure 25: NATO Education and Training Institutions

CDR Sondergaard gave more guidance on political and military direction and guidance for the operational commander's performance gaps and analysis that is directly tied to quality assurance of the training courses and levels of educational standards.

CDR provided a brief on the present and future technology to support education, training & exercises in NATO, dreams and practicalities. He discussed where we are today as it relates to NATO ACT and the e-Learning Visions coherent approach

"e-Learning as an innovative

and powerful method of teaching and learning,

directed, coordinated and promoted by ACT at the

Strategic level, whilst delegated to the most

appropriate ETF to produce, develop, deliver and

maintain effective, relevant and high quality courses"

CDR showed some examples of integration of live training, man to machine interfaces and how we get there. He mentioned that in order to get to these immersive environments we need to have senior leader buy in enter the Joint Force Trainer Role at NATO ACT new post established in 2010:

- Break the "old model of NATO ETE" (Education, Training and Exercises) Re-think the objectives, capabilities and needs. More effective both in cost and achievement.

- Utilise modern technology to assist in:

  - Individual Education and Training (eLearning, Immersive Learning, Mobile Learning, Small Team Training)

  - Collective Training – Distributed Training, Simulation, replication as near as possible of operational situation

  - Immersive training environments current projects

    - VBS2 NATO

    - Borders Ahoy

    - Village survey

He also gave more details on the immersive training environments as it relates to future considerations.

- Study ITE products and national assessments to capture metrics and seek "value added" to using this technology.

- Work with industry to evaluate current capabilities and joint efforts.

- Work with NATO and nations to increase use of distributed training to meet Connected Forces Initiative goals.

- Increased cooperation with nations IOT share assets and development where possible "learn once and share" across NATO and partners.

He concluded with the need to cooperate with industry and NATO partners on the uses of commercial games for uses in E-learning and other immersive environments.

5.14 Social and Casual Games – Stu Armstrong – QinetiQ

Mr. Armstrong provided a presentation on "so, what's social gaming?" –

He provided examples of acquisitions in the past:

- In November 2009 Electronic Arts acquired Playfish for $300M at the same time as announcing a global layoff of 1,500 employees

- In July 2010 Disney acquires Playdom for $564M

- 2011 there were over 20 mergers & acquisitions involving Facebook game developers costing in excess $1.7billion

He further gave the example of Farmville and its rapid growth, as well as

Angry Birds – 30 million players a day and 300 million hours per day spent playing.

Below he provided a screen shot of Zynga Inc. Stock and its decline in 2012 to wonder if that fad is over. See below.

Figure 26: Zynga Inc. Stock Decline

This is just an example. So is the FAD over for casual games?

He further gave an example of Foldit, a social game that enables the ability to do protein folding, and the results were used to help them solve problems of a virus using game play that was extremely successful as shown below.
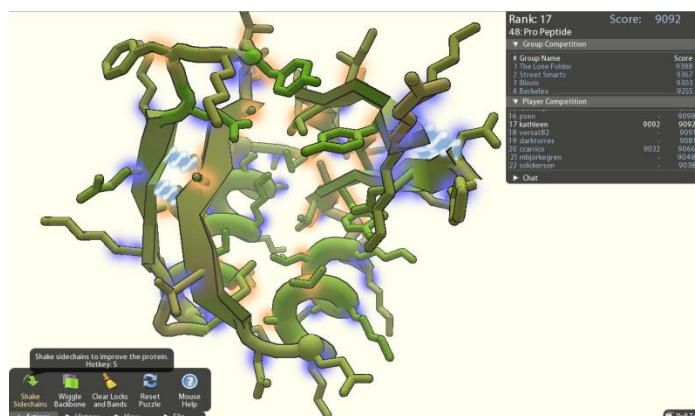

Figure 27: Foldit

He gave some examples of wowwiki – and WoW videos learning and training on how to win in WoW. He showed an example of WoW .

He discussed the use of game play for use in the potential spread of infectious diseases, and used the example in EVE.

Stu concluded that he thinks it is not a fad of the fading casual games fall in revenue development. Social games – "curiosity" is an example where all you do is click the screen. It's a very boring game but it's been used by 1.5 million people in the first week.

Recap from Wayne Buck, Stu Armstrong, Dr. Johnny Garcia and Dr. Elaine Raybourn.

Discussed the event for spring 2013 and opened up the floor to the audience.

Ideas for structure of future workshop

1) Generate more ideas and issues/uses to work on like structure design and metrics for planning – have more time for syndicate groups;
2) Validation of the gaming applications;
3) More technical discussions in future workshops;
4) Continue to push the idea of serious games as a capability;
5) Would like to know who is the main provider of serious games;
6) Aid the Military in how to manage this technology to create an educational path in order to use serious games;
7) How to use serious games in Concept development and experimentation; and
8) Users of the technologies need to be invited to workshop.

6.0 CONCLUSION AND RECOMMENDATIONS

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

- Validation and Measures of the environments and how its 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 our findings of workshops in formal conferences like IITSEC, SISO, and GAMETECH ETC.

6.1 Conclusion

Participants and workshop organizers assessed this session of MSG-114 as a success. The workshop met its objectives:

- provide demonstrations and presentations to explore uses of commercial games and technologies in support of decision support, training, educational concept development and experimentation

- provide updates on the nations' current application of commercial technologies

- provide capability briefings

NATO partner nations currently use commercial games and technologies. The workshop participants concluded that a need exists and to continue pursuing commercial game technology solutions. This may require review of existing acquisition and procurement guidelines.

Finally, NATO and ACT enjoyed an organizational infrastructure and innovative partners to facilitate these types of workshops in the future. They should continue to do so.

6.2   Recommendations

As noted in the closing discussion, gaming technology has been proven to enhance operations. The workshop focused on providing examples of these transformational changes in NATO nations and organization and shows that serious games are the future, and the workshop has provided value and should and will continue to do so.