MMOWGLI Game Overview

CENIC, 12 March 2012

Don Brutzman

Modeling Virtual Environments Simulation (MOVES) Institute
Naval Postgraduate School
mmowgli
massively multiplayer online war game leveraging the internet
Web-based collaboration game for brainstorming ideas

MMOWGLI is a social-network tool for crowd-sourced brainstorming, sponsored by the Office of Naval Research (ONR) for the United States Navy. We built an innovative open-source Web-engine to explore strategy development and expand community engagement in complex geopolitical problems.
Example dialog: 4 types of response

DEFEND

What if radical elements or rogue states "contract" pirates to deliver chemical, nuclear, or other banned products to terrorist?

Taco 05/27 06:02 PDT

EXPAND

Build on this idea to amplify its impact.

EXPAND

Not necessarily directly related to piracy - more of an expansion of the business base to include smuggling.

Taco 05/27 05:58 PDT

COUNTER

Challenge this idea.

COUNTER

Radicals would be going out of their way to contract pirates. It would be easier to use a trusted source for smuggling, one of their own.

erwin 05/27 12:08 PDT

ADAPT

Take this idea in a different direction.

ADAPT

This builds on the idea that piracy is for monetary purposes. Some have offered that they only pirate to replace income, need vs greed.

ekmarzew 05/27 06:33 PDT

EXPLORE

Something missing? Ask a question.

EXPLORE

I like this, but how do you see this happening? Would pirates deliver through hijacked ships? Current suits/mergerships seems

ekmarzew 05/27 08:32 PDT
Thoughtful idea chains
Super-active chains are sets of cards that have two or more authors and four or more follow-on cards at two levels.

<table>
<thead>
<tr>
<th>CARD CONTENT</th>
<th>AUTHOR</th>
<th>CREATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3678) EPIC builds several Oil Rig like Platforms</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3683) Tethered air balloon videos to oil platform</td>
<td>starship123</td>
<td>06/2</td>
</tr>
<tr>
<td>(3690) Perhaps we couple this with a blue force</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3693) Over 99% of all unknown vessels will be</td>
<td>Finius Stormtroth</td>
<td>06/2</td>
</tr>
<tr>
<td>(3666) WORST STRATEGY: A military led unilat.</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3668) Re: military led unilaterial YSU nation build</td>
<td>gm_Rachel</td>
<td>06/2</td>
</tr>
<tr>
<td>(3676) This should be a State Dept, USAID and I</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3679) Work with Islamic Court Union (ICU) to for</td>
<td>starship123</td>
<td>06/2</td>
</tr>
<tr>
<td>(3688) Depends on where the popular support lie</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3692) The ICU effectively collapsed in 2007, so</td>
<td>Finius Stormtroth</td>
<td>06/2</td>
</tr>
<tr>
<td>(3627) 2014 should see innovation in non-lethal</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3630) dolphins identify ships without highly cont</td>
<td>progressive thinker</td>
<td>06/2</td>
</tr>
<tr>
<td>(3634) What is the range for dolphins? Could thi</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3663) Use the same principle but instead of dolp</td>
<td>progressive thinker</td>
<td>06/2</td>
</tr>
<tr>
<td>(3627) 2014 should see innovation in non-lethal</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3630) dolphins identify ships without highly cont</td>
<td>progressive thinker</td>
<td>06/2</td>
</tr>
<tr>
<td>(3634) What is the range for dolphins? Could thi</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
<tr>
<td>(3659) Robotic swimmers tasked to certian areas</td>
<td>progressive thinker</td>
<td>06/2</td>
</tr>
<tr>
<td>(3669) One issue might be that</td>
<td>redsparow1</td>
<td>06/2</td>
</tr>
</tbody>
</table>
# Action Plan Dashboard

**Card chains lead to Action Plans**

### Action plans

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Action plans can help solve piracy problems: guidance</td>
<td>gm_melody, gm_Rachel, gm_donb, gm_lucian</td>
</tr>
<tr>
<td>2</td>
<td>Naval blockades</td>
<td>Parabellum, gm_Rachel, gm_chad, gm_donb, gm_dano, gm_donb, gm_donm, gm_garth</td>
</tr>
<tr>
<td>3</td>
<td>Unmanned Vehicle Sentry</td>
<td>gm_dano, gm_donb, gm_donm, gm_garth</td>
</tr>
<tr>
<td>4</td>
<td>How to stop piracy by using unmanned vehicles</td>
<td>Mastermind, gm_Rachel, firefly2878, gm_dont</td>
</tr>
<tr>
<td>5</td>
<td>Establish an International Fusion Cell in the Region</td>
<td>mark.paytas, gm_donb, HotRod82, navarchus</td>
</tr>
<tr>
<td>6</td>
<td>Use of Convoys</td>
<td>nikonamscope, dieselpunk1, jersey, gm_garth</td>
</tr>
<tr>
<td>7</td>
<td>Long-term social change using the theme of shaming</td>
<td>gadfly, gm_donb, redsparow1, dieselpunk1, G1</td>
</tr>
<tr>
<td>8</td>
<td>Manipulating Interests</td>
<td>Mastermind, gm_Rachel, Finius Stormfroth</td>
</tr>
<tr>
<td>9</td>
<td>How can the YSU govern itself without piracy?</td>
<td>gadfly, gm_Rachel, Ears McShane, dieselpunk1</td>
</tr>
<tr>
<td>10</td>
<td>How to bargain with YSU on fair passage tax?</td>
<td>aspizier, Ears McShane, dieselpunk1, mario63</td>
</tr>
<tr>
<td>11</td>
<td>How would a peer-to-peer pirate patrol work?</td>
<td>gm_garth</td>
</tr>
<tr>
<td>12</td>
<td>Approach YSU with a plan to develop a system of control</td>
<td>firefly2878, secund3r</td>
</tr>
<tr>
<td>13</td>
<td>New ways for transport through the region</td>
<td>gadfly, nikonamscope, GCReport</td>
</tr>
<tr>
<td>14</td>
<td>Pirates target unarmed vessels. Revert to the right to</td>
<td>Mastermind, gm_donb, gm_luciano, gm_jenn, gm_Rachel, redsparow1, gm_garth</td>
</tr>
<tr>
<td>15</td>
<td>Develop Khat Industry Worldwide As Alternative to Piracy</td>
<td>gm_Rachel, redsparow1, gm_garth</td>
</tr>
<tr>
<td>16</td>
<td>Exploiting New Opportunities to Transform the Political</td>
<td>Finius Stormfroth, gm_donb</td>
</tr>
<tr>
<td>17</td>
<td>Crowdsourcing of Data/Intel</td>
<td>gm_Rachel, Mastermind, progressive thinker, gm_garth</td>
</tr>
<tr>
<td>18</td>
<td>Dolphins that identify highly controlled chemical tracer</td>
<td>pending</td>
</tr>
<tr>
<td>19</td>
<td>Investigation of shipping company employees and GPS</td>
<td>pending</td>
</tr>
</tbody>
</table>

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**All Plans**

Click on this tab to see a list of all action plans which exist in the game. The other two tabs show lists of action plans filtered in various ways.
The Somali coastline is over 3000Km long, which is equivalent to the west & east coast lines of the U.S. That area would be hard to cover with existing UAVs because their sensors don't have the range.

This plan discusses using naval blockades to deter piracy.

The Yemen-Somalia Union (YSU) is conducting acts of piracy using its coast guard assets. It is easier to monitor and interdict a few small areas, than to monitor and protect a much larger one. A naval blockade of the Somali coastline will ensure the pirates cannot gain access to the high seas. Heavy emphasis will be placed on known pirate camps and areas of significant intelligence.

The resources needed are already in the Gulf of Aden and Indian Ocean, except an increase in Coast Guard Ledets, but utilizing a blockade the amount of ships should be able to decrease, even keeping patrols along the IRTC. Assets needed: Surface ships (at least 2 amphibious) w/VBSS teams, Coast Guard Ledets or other federal agents, UAVs, P-3, helos.
Action-plan authors can chat, players can comment

How will it work?

- Phase 1: Shaping
  Task: Identify Key Pirate Nodes
  Task: Diplomatic shaping – local, regional, global

How will it change the situation?

- Naval blockade of key pirate nodes will make it hard/costly for pirates to do business. This attacks the goal of YSU-sponsored piracy, which are the economic benefits. It is not a complete solution in and of itself, but it can significantly reduce the incidents of piracy. It is the most feasible and realistic action the international community can take.

Comments:

marknavas  Thu, 23 Jun 2011 07:20:32 PDT
The Somali coastline is over 3000Km long, which is equivalent to the west & east coast lines of the U.S. That area would be hard to cover with existing UAVs because their sensors don't have the range.

mario 69  Wed, 22 Jun 2011 18:42:20 PDT
I like everything about this, but it will be expensive to cover so much area and it must be sustained for a long time. $$$
### Chat:

<table>
<thead>
<tr>
<th>User</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>@Clayman</td>
<td>satellite surveillance could be costly over long term, and I'm not smart enough to know how persistent that could be. Should definitely leverage satellite imagery to supplement air-breathing ops.</td>
</tr>
<tr>
<td>Parabellum</td>
<td>Please ignore my last post here -- nation building is OBE.</td>
</tr>
<tr>
<td>Parabellum</td>
<td>the long-term piece of this needs lots of thinking. Hinges on whether there is a nation-building effort to support and transition to. That's hard, and short of that, this could be an op that runs for decades. Unmanned platforms would help, but international political will to continue the blockade would be key.</td>
</tr>
<tr>
<td>Parabellum</td>
<td>I just added some initial ideas for phasing and general tasks, and to resources needed.</td>
</tr>
</tbody>
</table>

### Images:

**Caption:**

Pirate vessels are sometimes destroyed after capture. Some nations take pirates prisoners to face justice, if it can be found.

**Caption:**

Modern pirates are well funded and well equipped with combat weapons and communications gear.
Why is MMOWGLI a game?

Because each player gets points and can win

• Both for Idea Cards and for Action Plans

But, scoring is indirect

• Players only get points for responses by other players
• Thought leaders and good ideas emerge

Thus, biggest game value is group collaboration and “crowd-sourcing” intelligent responses
# Game Statistics 2011

<table>
<thead>
<tr>
<th>Move 1-2-3</th>
<th>Move N-Alfa</th>
<th>Move N-Bravo</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dates</td>
<td>31-May-3 June, 21-23 June, 5-8 July</td>
<td>7-9 November</td>
<td>10-13 November</td>
</tr>
<tr>
<td>Days duration</td>
<td>11</td>
<td>3</td>
<td>3.5</td>
</tr>
<tr>
<td>Signups</td>
<td>16,000</td>
<td>31,000</td>
<td>31,000</td>
</tr>
<tr>
<td>Invitees</td>
<td>2,200</td>
<td>7,500</td>
<td>7,500</td>
</tr>
<tr>
<td>Players</td>
<td>832</td>
<td>920</td>
<td>413</td>
</tr>
<tr>
<td>Signup %</td>
<td>30.7%</td>
<td>12.3%</td>
<td>5.5%</td>
</tr>
<tr>
<td># Idea Cards</td>
<td>5142</td>
<td>5608</td>
<td>4228</td>
</tr>
<tr>
<td># Action Plans</td>
<td>28</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td># Game Master Accounts</td>
<td>29</td>
<td>50</td>
<td>46</td>
</tr>
</tbody>
</table>
3-tier architecture: client, server, database
Runs through web browser
Scalable, repeatable, open source codebases
Software development

Java programming for robustness
  • VAADIN graphical user interface (GUI) toolkit
  • Google Web Toolkit (GWT) for cross-browser use

BUT output is html, javascript, .war archives
  • So results are high quality and consistent across all flavors of Web browsers
  • Internet Explorer, Firefox, Chrome, Safari, Opera

Numerous open-source tools used
  • Building, loading, monitoring, testing, reporting
Akamai Content Delivery Services, [http://www.akamai.com](http://www.akamai.com) (contract by ONR)

Apache secure http server, [http://apache.org](http://apache.org)

Apache ActiveMQ message queue for intra-cluster synchronization, [http://activemq.apache.org](http://activemq.apache.org)

Apache Tomcat servlet containers, [http://tomcat.apache.org](http://tomcat.apache.org)

AWStats free real-time logfile analyzer to get advanced statistics, [http://awstats.sourceforge.net](http://awstats.sourceforge.net)

BrowserMob cloud-based load tests for multiple browsers, [https://browsermob.com](https://browsermob.com) (contract)

Client Web browsers supported: Chrome, Firefox, Internet Explorer, Opera, Safari

Eclipse Integrated Development Environment (IDE), [http://eclipse.org](http://eclipse.org)

Google Web Fonts, [http://www.google.com/webfonts](http://www.google.com/webfonts)

Google Web Toolkit (GWT), [http://code.google.com/webtoolkit](http://code.google.com/webtoolkit)

Hibernate Java-based relational database persistence API, [http://www.hibernate.org](http://www.hibernate.org)

Java programming language, [http://java.oracle.com](http://java.oracle.com)

JMeter load testing and performance measuring, [http://jmeter.apache.org](http://jmeter.apache.org)

LifeRay Community Portal, [http://www.liferay.com](http://www.liferay.com)

Linux operating system by CentOS, [http://www.centos.org](http://www.centos.org)

Mailman GNU archived list server, [http://www.list.org](http://www.list.org)

MySQL database, [http://www.mysql.com](http://www.mysql.com)

Netbeans Integrated Development Environment (IDE), [http://netbeans.org](http://netbeans.org)

Selenium unit testing for Web browser clients, [http://seleniumhq.org](http://seleniumhq.org)

Subversion for version control, [http://subversion.apache.org](http://subversion.apache.org)

Squid caching proxy for Web server optimization, [http://www.squid-cache.org](http://www.squid-cache.org)

Vaadin GUI framework, [https://vaadin.com](https://vaadin.com)

Vaadin Testbench, [https://vaadin.com/add-ons/testbench](https://vaadin.com/add-ons/testbench) (license)
Card Tree

Alpha game, 11-9-11

Innovate Cards

2 Situational awareness for fleet operations will need to include good knowledge sharing with other ships from partner countries.

1898 Perhaps a unified system for exchanging sensor information as well as location.

368 Do you mean like a gis system tracking known ships with other known ships?

4 further news about MMOWGLI is available now on the game blog and portal. https://portal.mmowgli.nps.edu/game-blog

3156 testing a new card

5 Recruiting personnel with deep local knowledge of future operating environments

5911 Incorporate local language and customs training into training regimens to increase ability of soldiers to interact/eavesdrop on civil

1903 Depending on the region this could be difficult

7 Develop dynamic, engaging and realistic training scenarios designed to prepare navy personnel for the actual challenges they will

17 What exactly do you mean? Is this not something that is already happening?

9 Develop/employ persistent, high endurance ISR UAVs, such as blimps in order to maintain situational awareness in the non-permi

4726 Exceptionally useful, but buy-in among players already on-scene is critical. We don't HAVE to own the assets if peers onboard.

3744 Are our current SA collecting capabilities unable to do the job required in the arctic? It doesn't seem like SA is necessarily the prob

4615 I'd say that ISR capabilities, particularly subsurface, are either limited, cost-ineffective, or both.

3786 What would you consider the biggest problem?

2822 If these were satellite mounted, they could also mount scientific instruments to deliver data to scientists and resource-hunters.

2857 Even high-altitude UAVs could mount scientific or dual-purpose instruments.

2820 In low intensity areas such as the Artic, blimps are suitable. Expand this based on threat/activity level using persistent UUV, UAV,

4786 ISIS is projected to be able to stay in place for years (3-10)

2855 A mix of HALE UAVs, blimp-type persistent UAVs and ship-launched medium range UAVs combined with USVs, and UUVs.

2458 Situational awareness is more important underwater.

2468 In some scenarios, yes, but not always. Take a look at adapt card 2320 however.

2320 Once facet in an unmanned network: HALE UAVs for dynamic ISR, tethered/semi-static blimp UAVs, USV motherships, networks

1588 Why deploy ISR UAVs? What if we tethered UAVs to shipping that traverses the danger zone? Eyes would be where we need them

2119 Had a dream about this last night. Tethered blimp-type UAVS can act as the 'second layer' of ISR to HALE UAVs.

3524 Excellent! The sensor and commo umbrella would be absolutely unreal
MMOWGLI Game Resources

- About MMOWGLI
- Credits and Contact
- Frequently Asked Questions (FAQs)
- Game Blog announcements
- Game Instructions (How to play and win!)
- Game News
- Press Coverage
- Terms and Conditions
- Twitter #mmowgli
- Video Resources

Somali Piracy Resources

- Articles about piracy in the news
- Bookshelf of longer works
- Games available elsewhere
- Glossary of terms, what does the jargon mean?
- Homeland Security Digital Library (HSDL) includes Maritime Domain and Sea Piracy collections
- Incidents of relevant interest
- Information Sources for further investigation
- Maps illustrating piracy activity
- Masters theses by graduate students
- Published papers exploring piracy issues in detail
Welcome Game Masters! The MMOWGLI Game Masters Wiki supports game and portal administration.

**MMOWGLI Game Resources**

- Communications and Outreach provides project details and public-affairs information
- Game Master Guidance
- Making a Post in the Game Blog describes how Game Masters make announcements and reports
- Mailing Lists for game-related information
- Operations Security (OPSEC) Considerations
- Testing details and Ganglia System Monitoring to view server and cluster loading
- Post-Game Analysis

Additional pages of interest follow.

**Children Pages**

- Apache Client-Server Optimizations
- Apache Web Server
- Beta Testers and Analysts
- Deploying Applications
- Fail2Ban
- Game Configuration
- Game Play
- GameMaster Guidance
- Human Research Protection
- Infrastructure Configuration
- Linux Server Optimizations
- Modeling and Simulation Design
- MySQL
- Network Administration
- Network Security
- Portal Admin How Tos
- Savage Lab System Inventory
- Urchin Web Analytics
- Vaadin Testbench
- Wiki Design Notes
Implications for Anti-Piracy Efforts

No longer waiting for ideas to be “put on the agenda”

Few barriers or limitations

“Bank” of ideas ready for further consideration

Holistic, creative solutions can be explored in depth
MMOWGLI design plan 2012

Three phases

• Energy MMOWGLI game
  • Stability, scalability, preparation and support

• Public release of MMOWGLI codebase
  • Ensure secure and repeatably usable so that potential partners don’t fork the source

• Additional games and improved features
  • Multiple adaptations and uses, stable growth
  • Data mining and analysis capabilities
2012 phases of work

I. **Reliability, testing and execution of next games**
   • Phase I to ensure that the MMOWGLI game platform has sufficient reliability and scalability to support the even-larger levels of game play expected for Energy MMOWGLI.

II. **Public release of repeatable open-source project**
   • Complete software capabilities needed for repeatably configure/administer new MMOWGLI games, complete public release of open-source software & documentation.

III. **Developing additional analytic capabilities**
   • Capitalize on the value of crowd-sourced data being collected by adding a variety of new features.
MMOWGLI 2012 design priorities

Multiple games for multiple communities
  - MMOWGLI Energy, ongoing piracy, maybe STEM?

Sharable game platform for multiple sponsors
  - Full baseline, security scrub, publish, governance

Improved game capabilities
  - Analysis tools, team play, mobile pads/phones

Repetition and growth
  - Build, test, diagnose, evaluate, repeat

Policy and access issues
  - Engaging minors, CAC or classified access, IRB release
Future work:
Lexical Link Analysis (LLA)
Future work:
LLA Features Shown as Word Pairs
### Play the game, check the game

<table>
<thead>
<tr>
<th>Asset</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game portal, public and game master</td>
<td><a href="https://mmowgli.nps.edu/portal">https://mmowgli.nps.edu/portal</a></td>
</tr>
<tr>
<td>Active game for inspection or play</td>
<td><a href="https://mmowgli.nps.edu/game">https://mmowgli.nps.edu/game</a></td>
</tr>
<tr>
<td>Initial rounds 1-2-3, June-July 2011</td>
<td><a href="http://test.mmowgli.nps.edu/initial">http://test.mmowgli.nps.edu/initial</a></td>
</tr>
<tr>
<td>Move November-Alfa, November 2011</td>
<td><a href="http://test.mmowgli.nps.edu/alfa">http://test.mmowgli.nps.edu/alfa</a></td>
</tr>
<tr>
<td>Move November-Bravo, November 2011</td>
<td><a href="http://test.mmowgli.nps.edu/bravo">http://test.mmowgli.nps.edu/bravo</a></td>
</tr>
<tr>
<td>Initial, partial analytic products (to be added to interface for each game)</td>
<td><a href="https://savage.nps.edu/Savage/mmowgli">https://savage.nps.edu/Savage/mmowgli</a></td>
</tr>
<tr>
<td>Preparing for a new game</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

### Theming preparation

What is main topic?  Who is the audience?  What are intended outcomes?

### Game-specific content

Customized for each game, captured and archived in a unique database
- Game name and game theme
- Call To Action video or slideset, linked
- Call To Action and Situation Report message prose
- Logo and page background
- Top-level card names, descriptions (e.g. Innovate vs. Status Quo)
- Color scheme (~10 complementary/contrasting colors)
- Initial exemplar action plan

### Optional layout changes

Some further tweaking is possible for customized look and feel
- HTML Cascading Stylesheet (CSS) for layouts and spacing
- Web fonts selection [http://www.google.com/webfonts](http://www.google.com/webfonts)
- Special images prepared for selection buttons

### User profile

Personality profile questions of interest that players can answer
- Location
- “Areas of expertise,” “Hope to learn about piracy,” etc.

### Other possible additions

- Eight award categories are built in, either awarded by moderators or else calculated from the game database as it is played
- Other categories are feasible, via database queries or user awards
- Pre-game and post-game survey questions
- Data-collection hooks for special analysis needs
IRB human subjects alternatives

Approved protocol: optionally hidden identity
- Also suitable for known-identity population pool

Navy or government only
- Identity known to other participants
- Restrict access via CAC, hostname or password

STEM, minors
- Special considerations for protecting participants
- More work planned
Conclusions

Customizable crowd-sourcing is feasible
- Large scale and small scale

Enterprise networking capabilities essential
- NPS has high-performance.edu, .mil networks
- Interaction, performance, reliability are critical
- Characteristics are similar to other endeavors, coordination is essential

Protections and due diligence are necessary
- Privacy, human-subjects research, security
Contact

Don Brutzman

brutzman@nps.edu
http://faculty.nps.edu/brutzman

Code USW/Br, Naval Postgraduate School
Monterey California 93943-5000 USA
1.831.656.2149 voice
1.831.656.7599 fax
MMOWGLI is a social-network tool for crowd-sourced brainstorming, sponsored by the Office of Naval Research (ONR) for the United States Navy. We built an innovative open-source Web engine to explore strategy development and expand community engagement in complex geopolitical problems.

mmowgli.nps.edu/game-blog