

*PROGRAM EXECUTIVE OFFICE FOR  
SIMULATION, TRAINING & INSTRUMENTATION*

# Huge Opportunities in Serious Games

Roger Smith  
CTO & Chief Scientist  
US Army PEO STRI



# Bio: Roger Smith



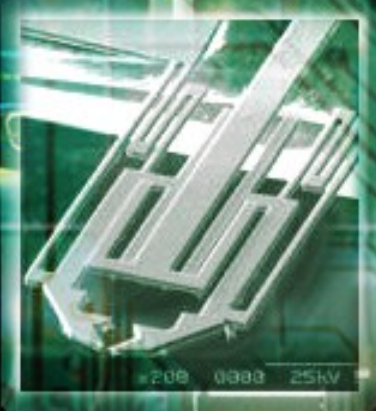
Dr. Roger Smith is the CTO for U.S. Army Simulation, Training and Instrumentation. He has given tutorials or lectures at the Game Developers Conference for 5 years and has published 3 chapters in the *Game Programming Gems* book series. He has published over 100 papers on business innovation, simulation, and gaming. He holds a Ph.D. in Computer Science and a Doctorate in Management.

His organization awards over \$2.5 billion dollars in government contracts each year for the development of simulations, simulators, and games.

**GAME TECHNOLOGY**



**HIGH PERFORMANCE COMPUTING**



**MEMS**

**CTO**

**CHIEF TECHNOLOGY OFFICER**

**IT ARCHITECTURES**

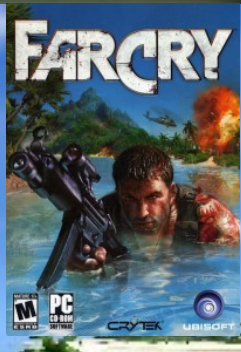


**LASER SENSITIVE MATERIALS**



**TRAINING SYSTEM EFFICIENCY**

# Game I Play Seriously



SimEarth



Wolfenstein



# Past Games

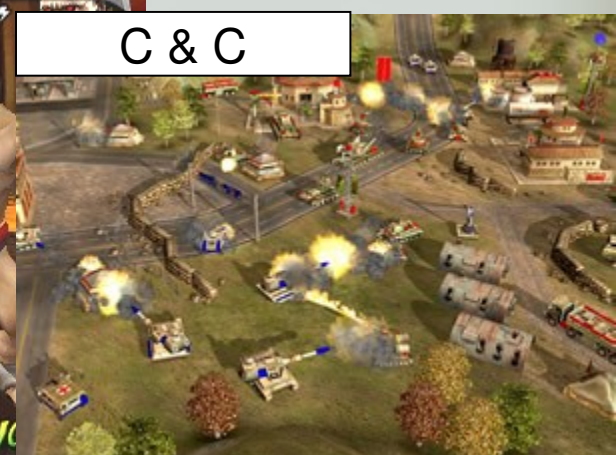
Diablo II



Mortal Kombat



C & C



Quake 2



UT2003



Sims Online

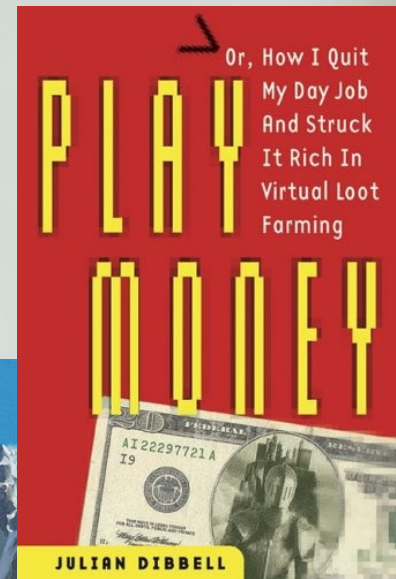


# Why are we talking about games?

“Play is to the 21<sup>st</sup> century what steam was to the 19<sup>th</sup> century” - Power that can be harnessed for social and economic benefits.



Julian Dibbell,  
*Play Money*



# Computer "Killer Apps"

C11 (L) TOTAL C1 25

A	B	C	D
ITEM	NO.	UNIT	COST
MUCK RAKE	42	12.95	556.85
BUZZ CUT	15	6.75	101.25
TOE TONER	250	4.95	1248.75
EYE SNUFF	2	4.95	9.90
SUBTOTAL			13155.50
9.75% TAX			1282.66
TOTAL			14438.16

Spreadsheet

H:INTRO PAGE 1 LINE 9 COL 11 INSERT ON  
 <<< MAIN MENU >>>

--Cursor Movement--  
 ^\$ char left ^D char right ^G char ^I Tab ^B Reform (from Main only)  
 ^A word left ^F word right DEL chr lf ^V INSERT ON/OFF ^J Help ^K Block  
 ^E line up ^X line down ^T word rt ^L Find/Replce again ^O Quick ^P Print

--Scrolling--  
 ^Z line down ^W line up ^N Insert a RETURN  
 ^C screen up ^R screen down ^U Stop a command

1. Introducing WordStar

WordStar is highly flexible and very visible. Watch the screens as you give commands, and information in various parts of the screen will guide you. You won't see all the information all the time but it will be there when you need it.

Word Processor

The signposts at the top of your screen, showing you where you are.

1HELP 2INDENT 3SET

NCSA Mosaic for MS Windows

File Edit Options Navigate Hotlist Annotate

Document Title: NCSA Mosaic Home Page

Document URL: http://www.nca.uiuc.edu/SDG/Software/Mosaic/NCSAMosaicHome.html

C S A  
 O S A I C  
 System • Microsoft Windows • Macintosh

NCSA Mosaic, an Internet browser and World Wide Web client. NCSA developed at the National Center for Supercomputing Applications at the University of Illinois in Urbana-Champaign. NCSA Mosaic software is copyrighted by Trustees of the University of Illinois (UI), and ownership remains with the

Development Group at NCSA has worked on NCSA Mosaic for nearly four years. We have learned a lot in the process. We are honored that we were able to help bring the World Wide Web to the masses and appreciated all the support and feedback we have received. However, the time has come for us to concentrate our limited resources in other areas of interest and development on Mosaic is complete. More information about the Mosaic project is available from the homepages.

Platforms:

try to

Access Page for persons with disabilities and WWW related Tutorials Resources Meta-Index at NCSA

NUM

Web Browser



3D Game Engine

PINE 3.87 COMPOSE MESSAGE Fol

To: jsmith@mhpc.edu  
 Cc:  
 Attachmt:  
 Subject:

----- Message Text -----

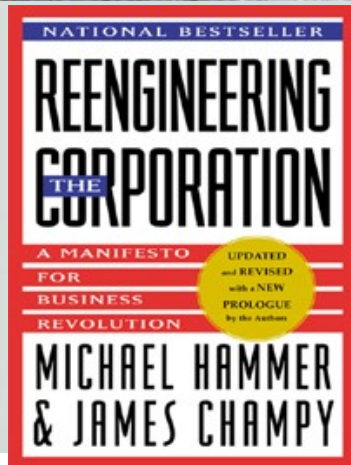
Get Help Cancel Rich Hdr  
 Send Del Char Attach

E-Mail

# The Enabling Role of New Technology



“The power of the Xerox copier did not lie in its capability to replace carbon paper and other existing copying technologies, but in its ability to perform services beyond the reach of these technologies. The 914 [copier] created a market for convenience copies that had previously not existed.”



(Hammer & Champy, 1993)

This is the power of game technologies. They create or enable a new need and then satisfy it.



# Military Simulations



# Military Games

DARWARS Iraqi Lang Trainer



IEWTPT Tactical Questioning



AMBUSH!



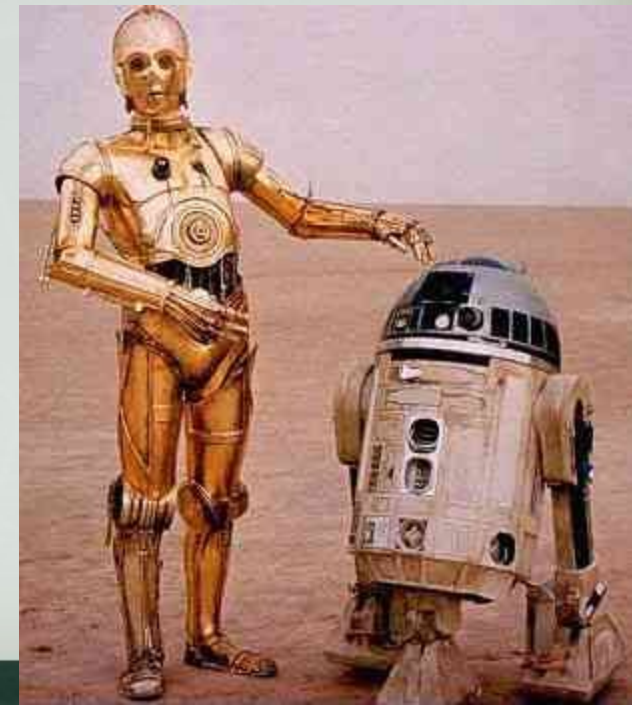
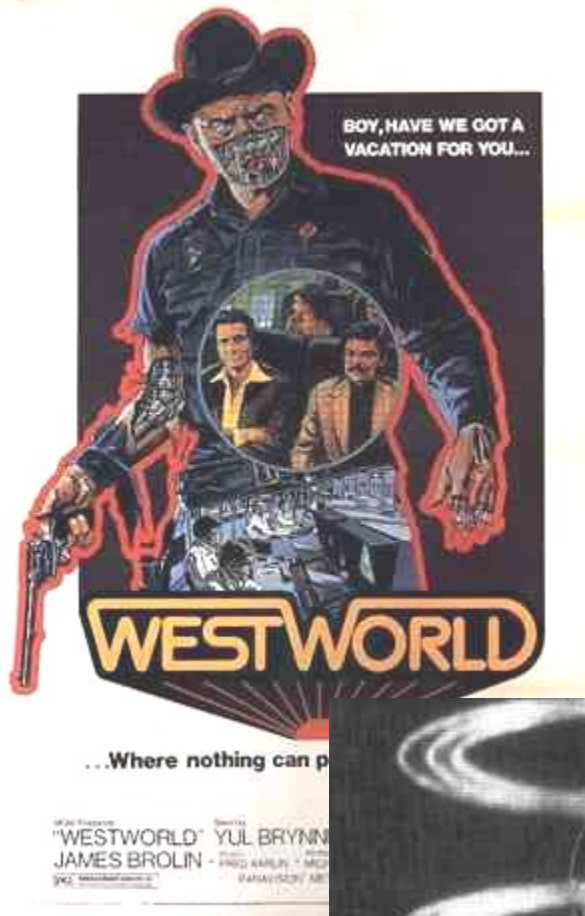
Americas Army



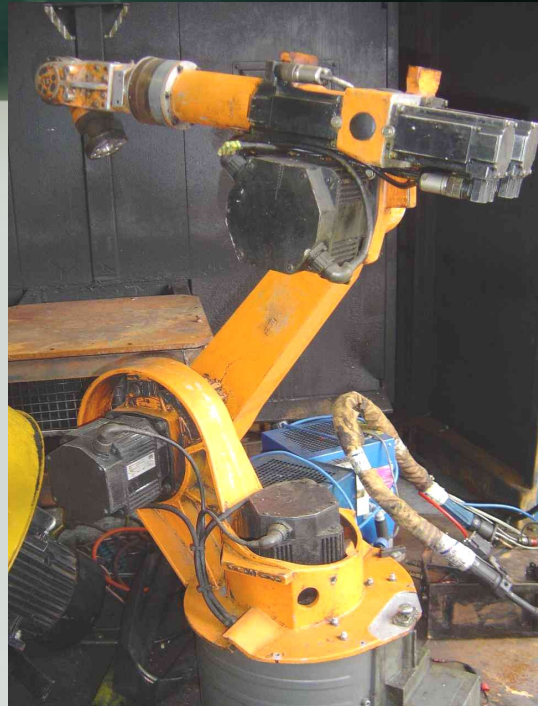
Full Spectrum Warrior



# Robot Analogy: Movie Robots



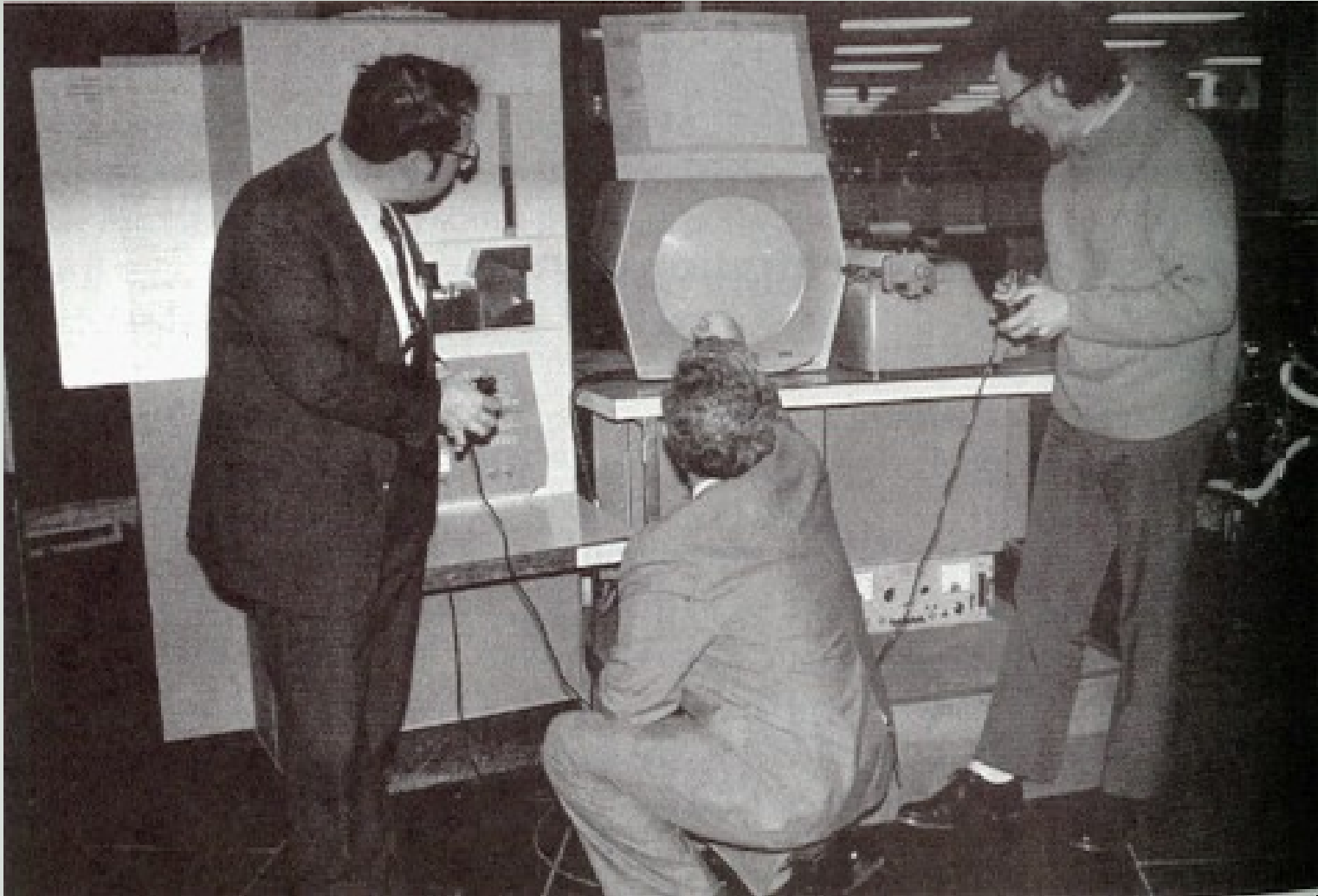
# Industrial Robots



12.27.1999



# First Interactive Computer Game



MIT, Spacewar! 1961

Not ATARI

# 1970 Serious Games Definition

“Reduced to its formal essence, a game is an activity among two or more independent decision-makers seeking to achieve their objectives in some limiting context. A more conventional definition would say that a game is a context with rules among adversaries trying to win objectives.

“We are concerned with serious games in the sense that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement.”

Abt, C. (1970). *Serious Games*. New York: The Viking Press.



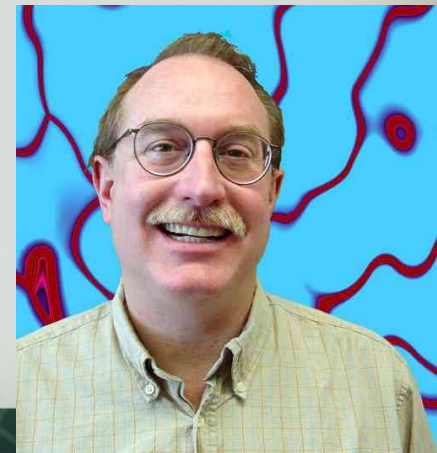
# 2005 Gaming Definitions

**Game:** “a physical or mental contest, played according to specific rules, with the goal of amusing or rewarding the participant.”

**Video Game:** “a mental contest, played with a computer according to certain rules for amusement, recreation, or winning a stake.”

**Serious Game:** “a mental contest, played with a computer in accordance with specific rules that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives.”

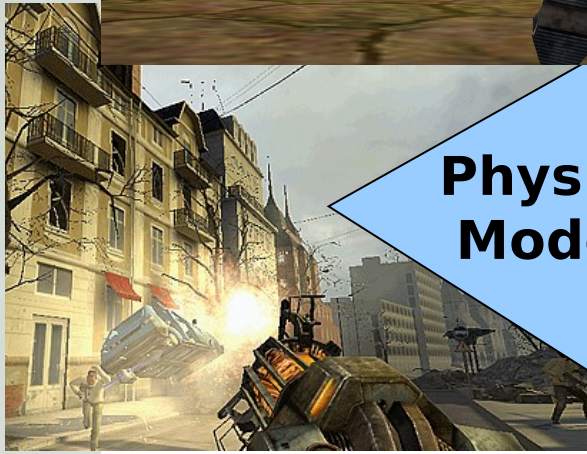
Zyda, M. (September 2005). “From visual simulation to virtual reality to games”. *IEEE Computer*.





**3D Engine**

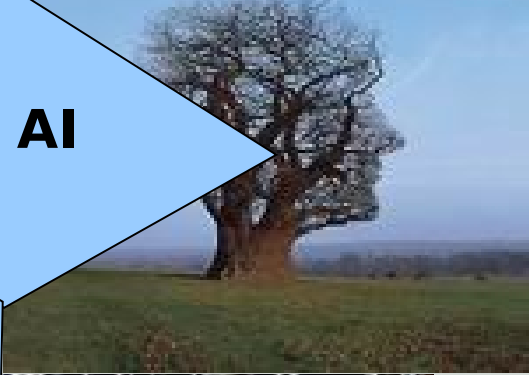
**GUI**



**Physical Models**

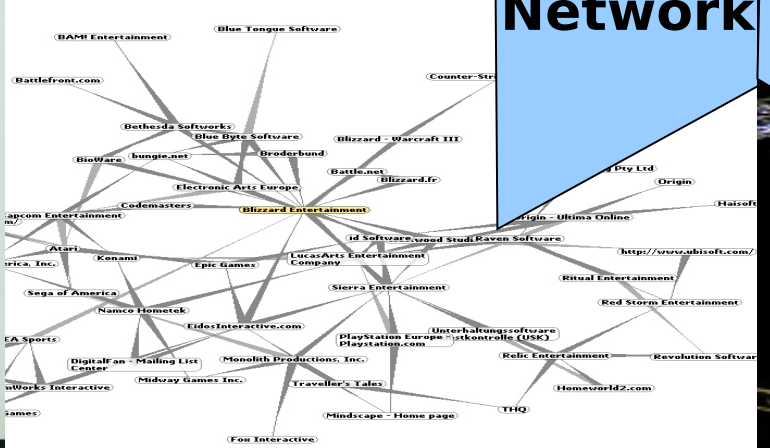
**Game Tech Core**

**AI**



**Network**

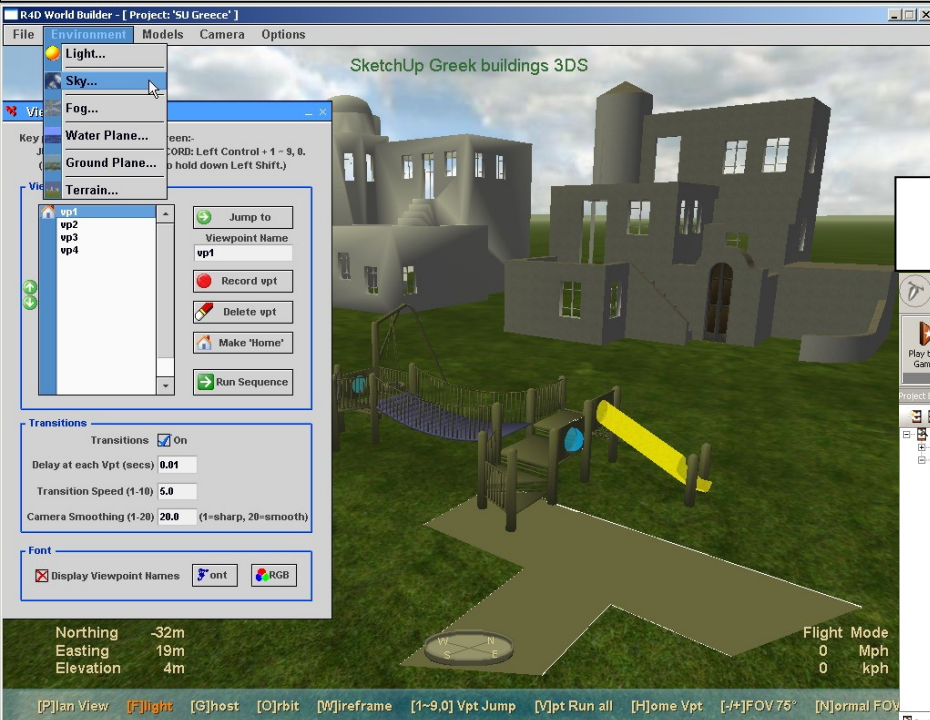
**Persistence**



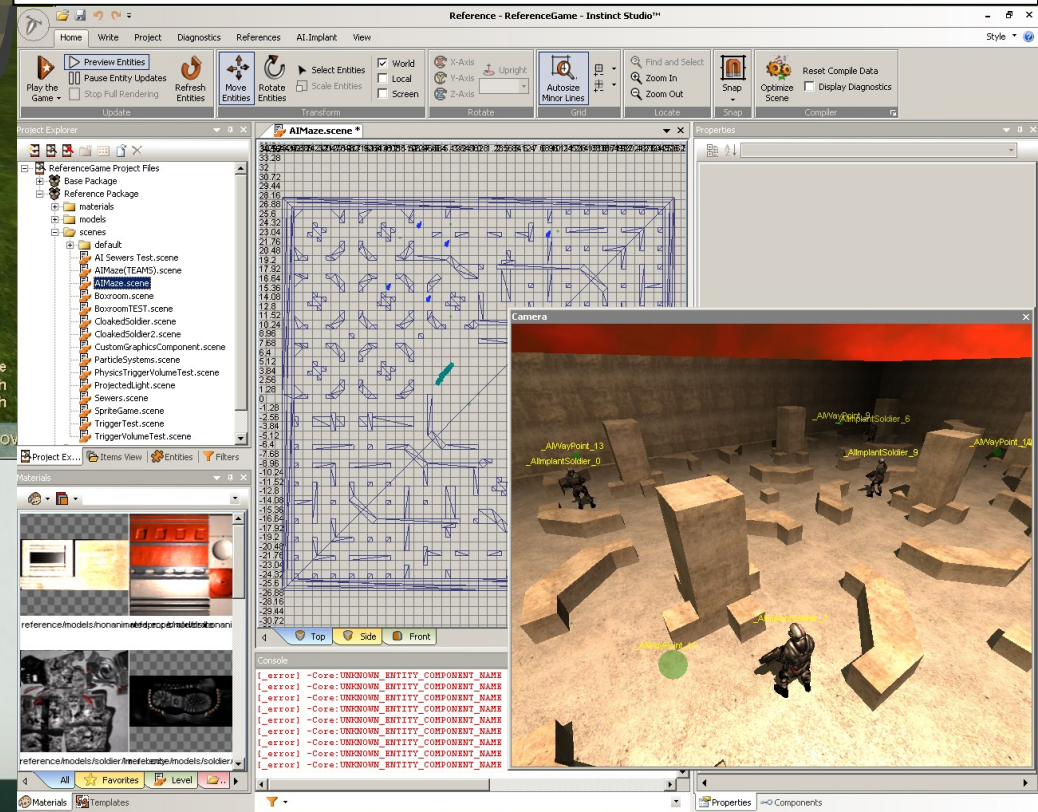


# Pre-Game Technologies

## World Building Tools

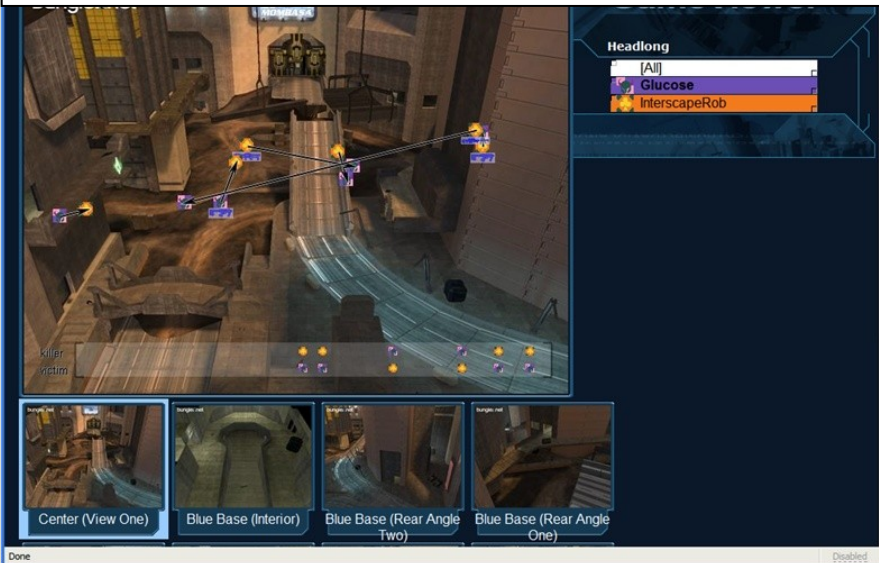


## Behavior Scripting



# Post-Game Technologies

## Game Recording



## AAR

Red Team Frags: 5

Weapon Control: 40%  
 Captures: 2  
 Ownages: 0  
 Efficiency: 50%



Blue Team Frags: 5

Weapon Control: 30%  
 Captures: 2  
 Ownages: 0  
 Efficiency: 50%

## Player & Team Stats

Philadelphia Phillies										
#	Player	AB	R	H	HR	BB	K	AVG	OBP	SLG
1	M. Ott, RF	1	0	0	0	0	0	0.000	0.000	0.000
2	R. F. Lindstrom, 3B	1	0	1	0	0	0	1.000	2.000	2.000
3	R. R. Hornsby, 2B	1	0	0	0	0	0	0.000	0.000	0.000
4	L. G. Harger, LF	1	0	0	0	0	0	0.000	0.000	0.000
5	L. S. Terry, 1B	0	0	0	0	0	0	0.000	0.000	0.000
6	R. T. Jackson, SS	0	0	0	0	0	0	0.000	0.000	0.000
7	R. J. Cummings, C	0	0	0	0	0	0	0.000	0.000	0.000
8	L. H. Mueller, CF	0	0	0	0	0	0	0.000	0.000	0.000
9	R. F. Fitzsimmons, P	0	0	0	0	0	0	0.000	0.000	0.000

New York Giants										
#	Player	AB	R	H	HR	BB	K	AVG	OBP	SLG
1	R. F. Thompson, 2B	1	0	1	0	0	0	1.000	2.000	2.000
2	R. J. Mook, LF	1	0	0	0	0	0	0.000	0.000	0.000
3	L. F. Leach, CF	1	0	0	0	0	0	0.000	0.000	0.000
4	L. C. Williams, RF	0	0	0	0	0	0	0.000	0.000	0.000
5	L. R. Wrightstone, 3B	0	0	0	0	0	0	0.000	0.000	0.000
6	R. S. McInnis, 1B	0	0	0	0	0	0	0.000	0.000	0.000
7	R. B. Detrick, SS	0	0	0	0	0	0	0.000	0.000	0.000
8	R. J. Wilson, C	0	0	0	0	0	0	0.000	0.000	0.000
9	L. J. Scott, P	0	0	0	0	0	0	0.000	0.000	0.000

Pitching: RHP Freddie 'Fat Freddie' Fitzsimmons										
Pitch	Count	Out	In Play	Strike	Ball	Fastball	Slider	Curveball	Changeup	Other
1	0-0	Called Strike	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph
2	0-1	Called Strike	Fastball	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph
3	0-2	In Play	Fastball	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph	88 Mph

Batting: LHB Cy Williams										
Stats	AB	R	H	HR	BB	K	ERA	SLG	OBP	SLG
Career	20	13	0	284	1	295	11	70	85	2.82
Season	0	0	0	0	0	0	0	0	0	0.000
Home	0	0	0	0	0	0	0	0	0	0.000
Away	0	0	0	0	0	0	0	0	0	0.000
Today	0	0	0	0	0	0	0	0	0	0.000

Team Info										
Team	AB	R	H	HR	BB	K	AVG	OBP	SLG	ERA
New York	4	0	4	0	0	0	0.250	0.500	0.500	0.000
Philadelphia	9	0	0	0	0	0	0.000	0.000	0.000	0.000



Play-by-Play  
 Hit any key or click mouse to continue.  
 hard hit ground ball...  
 to the left side...  
 Jackson with a nice pickup...  
 hard throw to first...  
 and that takes care of Williams for the third out.  
 That's three down...  
 No runs, one hit, no errors.  
 a runner left on...

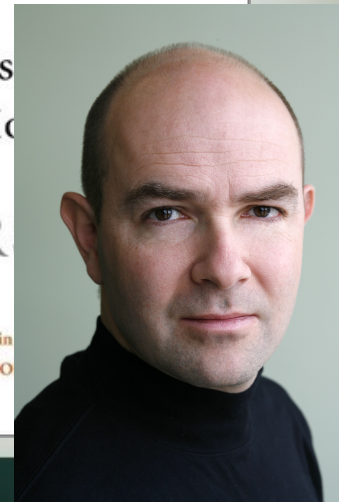
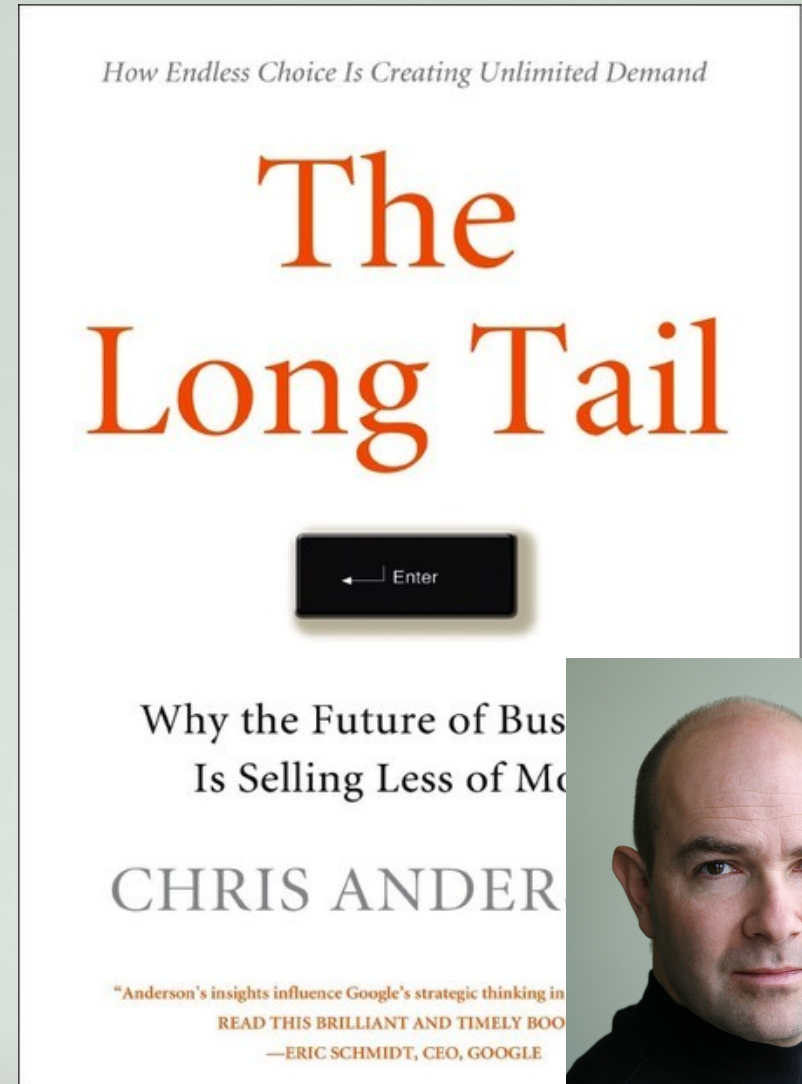
# The Long Tail

## Local Markets

- Physical products, delivery, and stocking
- Requires concentration into the “Top 100” products.

## Global Markets

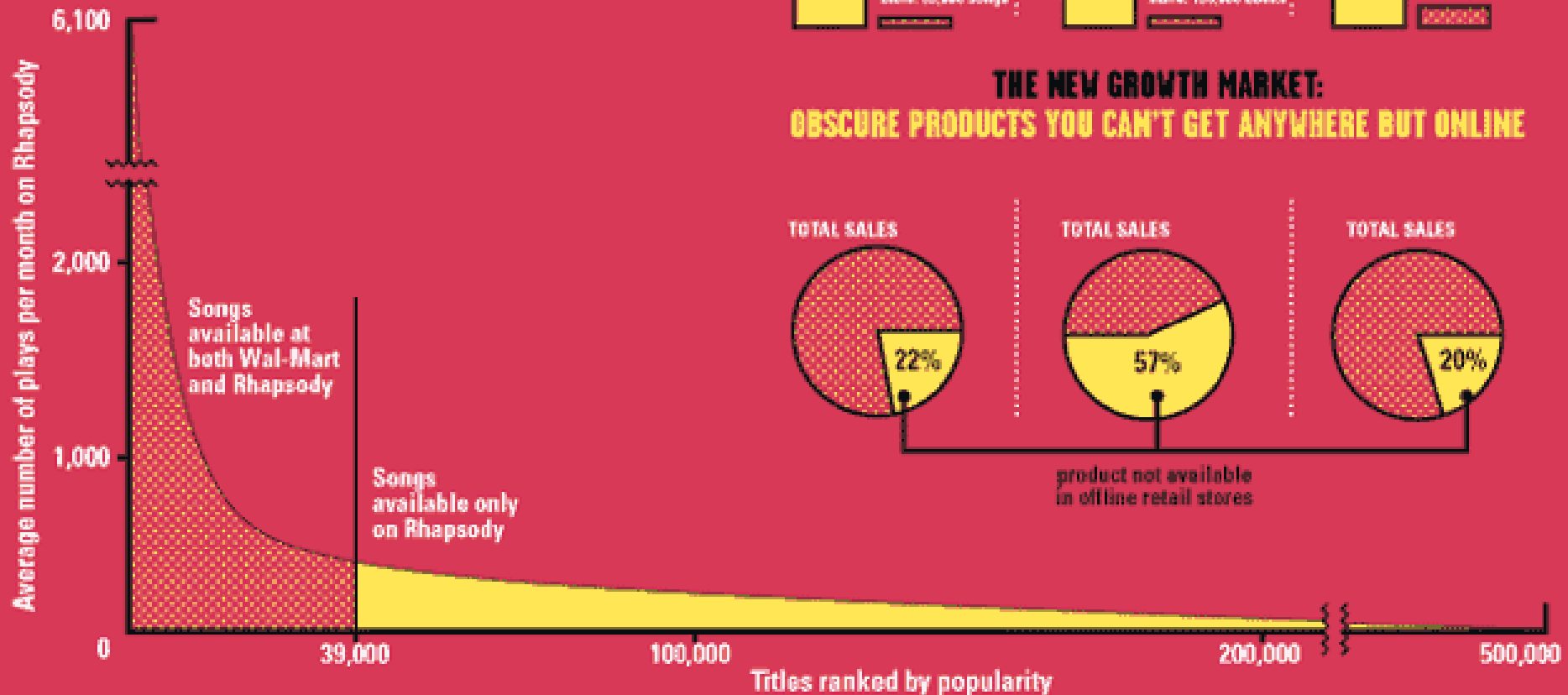
- Digital products, instant delivery, and free stocking
- Allows diversification into the “Top 100,000” products.



# The Long Tail of Digital Music

## ANATOMY OF THE LONG TAIL

Online services carry far more inventory than traditional retailers. Rhapsody, for example, offers 19 times as many songs as Wal-Mart's stock of 39,000 tunes. The appetite for Rhapsody's more obscure tunes (charted below in yellow) makes up the so-called Long Tail. Meanwhile, even as consumers flock to mainstream books, music, and films (right), there is real demand for niche fare found only online.



# iTunes Long Tail of Sales

In 2004 Apple iTunes contained about 1 million songs.



Question:  
What percentage of those  
sold at least 1 copy per  
business quarter?

**Answer: 100%**

# U.S. Army Military Occupational Specialties

## Enlisted MOS

**Infantry Branch**  
 11B Infantryman  
 11C Indirect Fire Infantryman  
 11X Infantryman (ambiguous; turns into 11B,11C, or 11M)  
 11Z Infantry Senior Sergeant  
 11H Infantry Anti-Armor Specialist  
 11M Mechanized Infantryman  
**Field Artillery Branch**  
 13B Cannon Crewmember  
 13C TAC Fire Operations Specialist  
 13D Field Artillery Tactical Data Systems Specialist  
 13E Cannon Fire Direction Specialist  
 13F Fire Support Specialist  
 13M Multiple Launch Rocket System Crewmember  
 13P MLRS/LANCE Operations Fire Directions Specialist  
 13R Field Artillery Firefinder Radar Operator  
 13S Field Artillery Surveyor  
 13W Field Artillery Meteorological Crewmember  
 13X Field Artillery Enlistment Option  
 13Z Field Artillery Senior Sergeant  
**Air Defense Artillery Branch**  
 14E Patriot Fire Control Enhanced Operator/Maintainer  
 14J Early Warning System Operator  
 14M Man Portable Air Defense System Crewmember  
 14R Bradley Linebacker Crewmember  
 14S Avenger Crewmember  
 14T PATRIOT Launching Station Enhanced Operator/Maintainer  
 14Z Air Defense Artillery (ADA) Senior Sergeant  
**Aviation Branch**  
 15B Aircraft Powerplant Repairer  
 15D Aircraft Powertrain Repairer  
 15F Aircraft Electrician  
 15G Aircraft Structural Repairer  
 15H Aircraft Pnedraulica Repairer  
 15J OH-58D Armament/Electrical/Avionics Systems Repairer  
 15K Aircraft Components Repair Supervisor  
 15M UH-1 Helicopter Repairer  
 15N Avionics Mechanic  
 15P Aviation Operations Specialist  
 15Q Air Traffic Control Operator  
 15R AH-64 Attack Helicopter Repairer  
 15S OH-58D Helicopter Repairer  
 15T UH-60 Helicopter Repairer  
 15U Medium Helicopter Repairer  
 15V Observation/Scout Helicopter Repairer  
 15X AH-64 Armament/Electrical Systems Repairer  
 15Y AH-64D Armament/ Electrical Systems Repairer  
 15Z Aircraft Maintenance Senior Sergeant  
**Special Forces Branch**  
 18B Special Forces Weapons Sergeant  
 18C Special Forces Engineer Sergeant  
 18D Special Forces Medical Sergeant  
 18E Special Forces Communications Sergeant  
 18F Special Forces Assistant Operations & Intelligence Sergeant  
 18X Special Forces Candidate  
 18Z Special Forces Operations Specialist

## Armor Branch

19D Cavalry Scout  
 19K Armor Crewmember  
 19Z Armor Senior Sergeant  
**Corps of Engineers Branch**  
 21B Combat Engineer (Formally 12B)  
 21C Bridge Crewmember  
 21D Diver  
 21E Heavy Construction Equipment Operator  
 21G Quarrying Specialist  
 21H Construction Engineer  
 21J General Construction Equipment Operator  
 21K Plumber  
 21L Lithographer  
 21M Firefighter  
 21N Construction Equipment Supervisor  
 21P Prime Power Production Specialist  
 21Q Transmission and Distribution Specialist  
 21R Interior Electrician  
 21S Topographic Surveyor  
 21T Technical Engineering Specialist  
 21U Topographic Analyst  
 21V Concrete and Asphalt Equipment Operator  
 21W Carpentry and Masonry Specialist  
 21X General Engineering Supervisor  
 21Y Topographic Engineering Supervisor  
 21Z Combat Engineering Senior Sergeant  
**Signal Corps Branch**  
 25B Information Systems Operator Analyst (*to be renamed Information Technology Specialist in Oct'07*)  
 25C Radio Operator Maintainer  
 25D Telecommunications Operator/Maintainer (*to be deleted in Oct'07*)  
 25F Network Switching Systems Operator/Maintainer  
 25L Wire Systems Installer  
 25M Multimedia Illustrator  
 25N Nodal Network Systems Operator/Maintainer  
 25P Microwave Systems Operator/Maintainer  
 25Q Multichannel Transmission Systems Operator  
 25R Visual Information/Audio Equipment Repairer  
 25S Satellite Communication Systems Operator/Maintainer  
 25T Satellite/Microwave Systems Chief  
 25U Signal Support Systems Specialist  
 25V Combat Documentation & Production Specialist  
 25W Telecommunications Operations Chief  
 25X Senior Signal Sergeant  
 25Y Information Systems Chief (*to be deleted in Oct'07*)  
 25Z Visual Information Operations Chief  
**Judge Advocate General Branch**  
 27D Paralegal Specialist  
**Military Police Corps Branch**  
 31B Military Police  
 31D CID Special Agent  
 31E Internment/Resettlement Specialist

## Military Intelligence Branch

33W (35T) MI Systems Maintainer/Integrator  
 96B (35F) Intelligence Analyst  
 96D (35G) Imagery Analyst  
 96H (35H) Imagery Ground Station Operator  
 96R (35H) Ground Surveillance Systems Operator  
 96U (35K) Unmanned Aerial Vehicle Operator  
 96Z (35X) Intelligence Senior Sergeant  
 97B (35L) Counterintelligence Agent  
 97E (35M) Human Intelligence Collector  
 97L (35Q) Translator/Interpreter  
 97Z (35Y) Counterintelligence/Human Intelligence Senior Sergeant  
 98C (35N) Signal Intelligence Analyst (Linguist)  
 98G (35P) Cryptologic Linguist  
 98P (35U) Multi-Sensor Operator  
 98Y (35S) Signals Collector/Analyst  
 98Z (35Z) Signals Intelligence Senior Sergeant  
 09L (35V) Translator Aide  
 05h EW/SIGINT Morse Intercept Operator  
**Psychological Operations Corps Branch**  
 20X Psychological Operations Specialist  
**Civil Affairs Branch**  
 38B Civil Affairs Specialist  
**Adjutant General Branch**  
 42A Human Resource Specialist  
 42F Human Resource Systems Information Specialist  
 42L Administration Specialist (*to be deleted*)  
 42R9B Trumpet Player  
 42R9C Baritone or Euphonium Player  
 42R9D French Horn Player  
 42R9E Trombone Player  
 42R9F Tuba Player  
 42R9G Flute or Piccolo Player  
 42R9H Oboe Player  
 42R9J Clarinet Player  
 42R9K Bassoon Player  
 42R9L Saxophone Player  
 42R9M Percussion Player  
 42R9N Piano Player  
 42R9T Guitar Player  
 42R9U Electric Bass Guitar Player  
 42S Special Band member  
**Finance Branch**  
 44C Finance Specialist/Accounting Specialist  
**Public Affairs Branch**  
 46Q Public Affairs Specialist  
 46R Broadcast Journalist  
 46Z Public Affairs Chief  
**Chaplain Branch**  
 56M Chaplain Assistant

## CMF 63 - Mechanical Maintenance

44B Metal Worker  
 44E Machinist  
 45B Small Arms/Artillery Repairer  
 45G Fire Control Repairer  
 45K Armament Repairer  
 52C Utilities Equipment Repairer  
 52D Power Generation Equipment Repairer  
 62B Construction Equipment Repairer  
 63A M1 Abrams Tank Turret Mechanic/M1 Abrams Tank System Mechanic  
 63B Light-Wheel Vehicle Mechanic/Heavy Wheel Vehicle Mechanic/Wheel Vehicle Repairer  
 63D Artillery Mechanic  
 63H Fuel and Electrical Repairer/Track Vehicle Mechanic  
 63J Quartermaster and Chemical Equipment Repairer  
 63M M2-3 Bradley Fighting Vehicle System Mechanic/Bradley Fighting Vehicle Systems Turret Mechanic  
 63X Track Vehicle Repairer  
 63W All Wheel Vehicle Repairer  
 63Z Mechanical Maintenance Supervisor  
**Medical Department Branches**  
 68A Medical Equipment Repairer  
 68D Operating Room Specialist  
 68E Dental Specialist  
 68G Patient Administration Specialist  
 68H Optical Laboratory Specialist  
 68J Medical Logistic Specialist  
 68K Medical Laboratory Specialist  
 68M Hospital Food Specialist  
 68P Radiology Specialist  
 68Q Pharmacy Specialist  
 68R Veterinary Food Inspection Specialist  
 68S Preventive Medicine Specialist  
 68T Animal Care Specialist  
 68V Respiratory Specialist  
 68W Health Care Specialist (aka Combat Medic)  
 68X Mental Health Specialist  
 68Z Chief Medical NCO  
**Chemical Branch**  
 74D Chemical Operations Specialist (formerly 54B)  
**CMF 79 - Recruiting and Retention**  
 79R Recruiter Noncommissioned Officer  
 79S Career Counselor  
 79T Recruiting and Retention NCO  
 79V Retention and Transition Noncommissioned Officer  
**Transportation Branch**  
 88H Cargo Specialist  
 88K Watercraft Operator  
 88L Watercraft Engineer  
 88M Motor Transport Operator  
 88N Traffic Management Coordinator  
 88P Railway Equipment Repairer  
 88T Railway Section Repairer  
 88U Railway Operations Crewmember  
 88Z Transportation Senior Sergeant

## Ordnance Branch

89B Ammunition Specialist  
 89D Explosive Ordnance Disposal Specialist  
**Quartermaster Corps Branch**  
 92A Automated Logistical Specialist  
 92F Petroleum Supply Specialist  
 92G Food Service Specialist  
 92L Petroleum Laboratory Specialist  
 92M Mortuary Affairs Specialist  
 92R Parachute Rigger  
 92S Shower/Laundry and Clothing Repair Specialist  
 92W Water Treatment Specialist  
 92Y Unit Supply Specialist  
 92Z Senior Noncommissioned Logistician  
**CMF 94 - Electronic Maintenance**  
 94A Land Combat Electronic Missile System Repairer  
 94D Air Traffic Control Equipment Repairer  
 94E Radio and Communications Security Repairer  
 94F Special Electronics Devices Repairer  
 94H Test, Measurement & Diagnostic Equipment Support Specialist  
 94K Automatic Test Equipment Operator/Maintainer  
 94L Avionics Communications Equipment Repairer  
 94M Radar Repairer  
 94P Multiple Launch Rocket System Repairer  
 94R Avionics System Repairer  
 94S Patriot System Repairer  
 94T Avenger System Repairer  
 94W Electronic Maintenance Chief  
 94Y Integrated Family of Test Equipment  
 94Z Senior Electronic Maintenance Chief  
**Branch Immaterial (not oriented to a branch)**  
 00Z Command Sergeant Major  
**Commissioned Officer & Warrant Officer MOS**  
 Officer MOS's are usually two numerical digits plus a letter (most of the time "alpha"). Letterless MOS's are ambiguous and have several specific MOS's within the E.g. 62 contains 62A (Emergency Physician) and 62B (Field Surgeon).  
 Warrant Officer MOS's (known as WOMOS) are three numerical digits plus a letter, except 09W who is not yet WO.  
**Officer Candidates**  
 09R Cadet  
 09S Officer Candidate  
 09W Warrant Officer Candidate  
**Infantry Branch**  
 11A Infantry Officer  
**Field Artillery Branch**  
 13A Field Artillery Officer  
 131A Field Artillery Targeting Technician  
**Air Defense Artillery Branch**  
 14 Air Defense Artillery Officer  
 140A Command and Control Systems Technician  
 140E Air and Missile Defense (AMD) Tactician/Technician (Patriot Systems Technician)  
 140X Air Defense Artillery (ADA) Immaterial

# U.S. Army Military Occupational Specialties

## Aviation Branch

15 Aviation Officer  
150A Air Traffic and Air Space Management Technician  
150U Tactical Unmanned Aerial Vehicle (TUAV)  
Operations Technician (still classified at 350K until official transfer to Aviation Branch)  
151A Aviation Maintenance Technician  
152C OH-6 Pilot  
152B OH-58A/C Pilot  
152D OH-58D Pilot  
152F AH-64A Pilot  
152H AH-64D Pilot  
153A Rotary Wing Aviator (Aircraft Nonspecific)  
153B UH-1 Pilot  
153D UH-60 Pilot  
153DD UH-60 MEDEVAC Pilot  
153H MH-60 Pilot  
154C CH-47D Pilot  
154E MH-47 Pilot  
155A Fixed Wing Aviator (Aircraft Nonspecific)  
155E C-12 Pilot  
155F Jet Aircraft Pilot  
155G O-5A/EO-5B/RC-7 Pilot

## Special Forces Branch

18A Special Forces Officer  
180A Special Forces Warrant Officer

## Armor Branch

19A Armor, General  
19B Armor  
19C Cavalry

## Corps of Engineers Branch

21A Engineer Officer  
210A Utilities Operation and Maintenance Technician  
215D Geospatial Information Technician (Old - Terrain Analysis Technician)

## Signal Corps Branch

25A Signal Officer  
250N Network Management Technician  
251A Information Systems Technician  
254A Signal Systems Support Technician  
255Z Senior Signal Systems Technician

## Judge Advocate General Branch

27A JAG Corps Attorney  
27B Military Judge  
270A Legal Administrator

## Military Police Corps Branch

31A Military Police Officer  
311A CID Special Agent

## Military Intelligence Branch

35D Military Intelligence Officer  
350F All Source Intelligence Technician  
350G Imagery Intelligence Technician  
350Z Attaché Technician  
350K (150U) Tactical Unmanned Aerial Vehicle Operations (*transferring to Aviation Branch in Summer 07*)  
351L Counterintelligence Technician  
351M Human Intelligence Collection Technician  
351Y Area Intelligence Technician  
352N Traffic Analysis Technician  
352P Voice Intercept Technician  
352Q Morse Intercept Technician  
352R Emanations Analysis Technician  
352S Non Morse Intercept Technician  
353T Intelligence and Electronic Warfare Technician

## Psychological Operations Corps Branch

37A Psychological Operations Officer  
37X Psychological Operations Officer, Designated

## Civil Affairs Branch

38A Civil Affairs Officer  
38X Civil Affairs Officer, Designated

## Adjutant General Branch

42B Personnel Systems Management Officer  
42C Band Officer  
420A Military Personnel Technician  
420C Bandmaster

## Finance Branch

44A Finance Officer

## Chaplain Branch

56 Chaplain  
56A Command and Unit Chaplain  
56D Clinical Pastoral Educator

## Medical Department Branches

60A OPERATIONAL MEDICINE  
60B NUCLEAR MEDICINE OFFICER  
60C PREVENTIVE MEDICINE OFFICER  
60D OCCUPATIONAL MEDICINE OFFICER  
60F PULMONARY DISEASE/CRITICAL CARE OFFICER  
60G GASTROENTEROLOGIST  
60H CARDIOLOGIST  
60J OBSTETRICIAN AND GYNECOLOGIST  
60K UROLOGIST  
60L DERMATOLOGIST  
60M ALLERGIST, CLINICAL IMMUNOLOGIST  
60N ANESTHESIOLOGIST  
60P PEDIATRICIAN  
60Q PEDIATRIC SUB-SPECIALIST  
60R CHILD NEUROLOGIST  
60S OPHTHALMOLOGIST  
60T OTOLARYNGOLOGIST  
60U CHILD PSYCHIATRIST  
60V NEUROLOGIST  
60W PSYCHIATRIST

61A NEPHROLOGIST

61B MEDICAL ONCOLOGIST/HEMATOLOGIST

61C ENDOCRINOLOGIST

61D RHEUMATOLOGIST

61E CLINICAL PHARMACOLOGIST

61F INTERNIST

61G INFECTIOUS DISEASE OFFICER

61H FAMILY MEDICINE

61J GENERAL SURGEON

61K THORACIC SURGEON

61L PLASTIC SURGEON

61M ORTHOPEDIC SURGEON

61N FLIGHT SURGEON

61P PHYSIATRIST

61Q RADIATION ONCOLOGIST

61R DIAGNOSTIC RADIOLOGIST

61U PATHOLOGIST

61W PERIPHERAL VASCULAR SURGEON

61Z NEUROSURGEON

62 Medical Corps Officer

62A Emergency Physician

62B Field Surgeon

63 Dental Corps Officer

63A General Dentist

63B Comprehensive Dentist

63D Periodontist

63E Endodontist

63F Prosthodontist

63H Public Health Dentist

63K Pediatric Dentist

63M Orthodontist

63N Oral and Maxillofacial Surgeon

63P Oral Pathologist

63R Executive Dentist

64A Veterinary Corps Officer

640A Veterinary Services Food Safety Technician

65 Medical Specialist Corps Officer

65A Occupational Therapy

65B Physical Therapy

65C Dietitian

65D Physician Assistant

65X Specialist Allied Operations

66 Nurse Corps Officer

66B Community Health Nurse

66C Psychiatric/Mental Health Nurse

66E Perioperative Nurse

66F Nurse Anesthetist

66G Obstetrics and Gyneco

66H Medical-Surgical Nurse

66N Generalist Nurse

66P Family Nurse Practitioner

67 Medical Service Corps Officer

67A Health Services

67B Laboratory Sciences

67C Preventive Medicine Sciences

67D Behavioral Sciences

67E Pharmacy

67F Optometry

67G Podiatry

67J Aeromedical Evacuation

670A Health Services Maintenance Technician

70A Healthcare Administrator

70B Health Services Officer

70C Comptroller

70D Information Systems Manager

70E Patient Administrator

70F Human Resources Manager

70H Plans, Operations, Intelligence Training, and Security

70K Medical Logistics

70K9I Health Facilities Management

## Chemical Branch

74A Chemical, General

74B Chemical Operations and Training

74C Chemical Munitions and Materiel Management

## Transportation Branch

88A Transportation Officer

88D Transportation Officer - Motor/Rail

880A Marine Deck Officer

881A Marine Engineering Officer

882A Mobility Officer

## Ordnance Branch

91A Ordnance Officer

890A Ammunition Technician

913A Armament Systems Maintenance Technician

914A Allied Trades Technician

915A Automotive Maintenance Technician

915E Senior Automotive Maintenance/Senior Ordnance

Logistics Officer

919A Engineer Equipment Maintenance Technician

## Quartermaster Corps Branch

92A Quartermaster Officer

920A Property Accounting Technician

920B Supply Systems Technician

921A Airdrop Systems Technician

922A Food Service Technician

923A Petroleum Systems Technician

## CMF 94 - Electronic Maintenance

948B Electronic Systems Maintenance Technician

948D Electronic Missile Systems Maintenance Technician

948E Senior Electronics Maintenance Technician

# Simulation's Long Tail

Trigger Pullers  
Combat Missions  
Life Threatening

\$50M project

Medical  
Logistics  
Intelligence

\$1M project

Signal/IT  
Linguist  
Interrogation

\$100K project

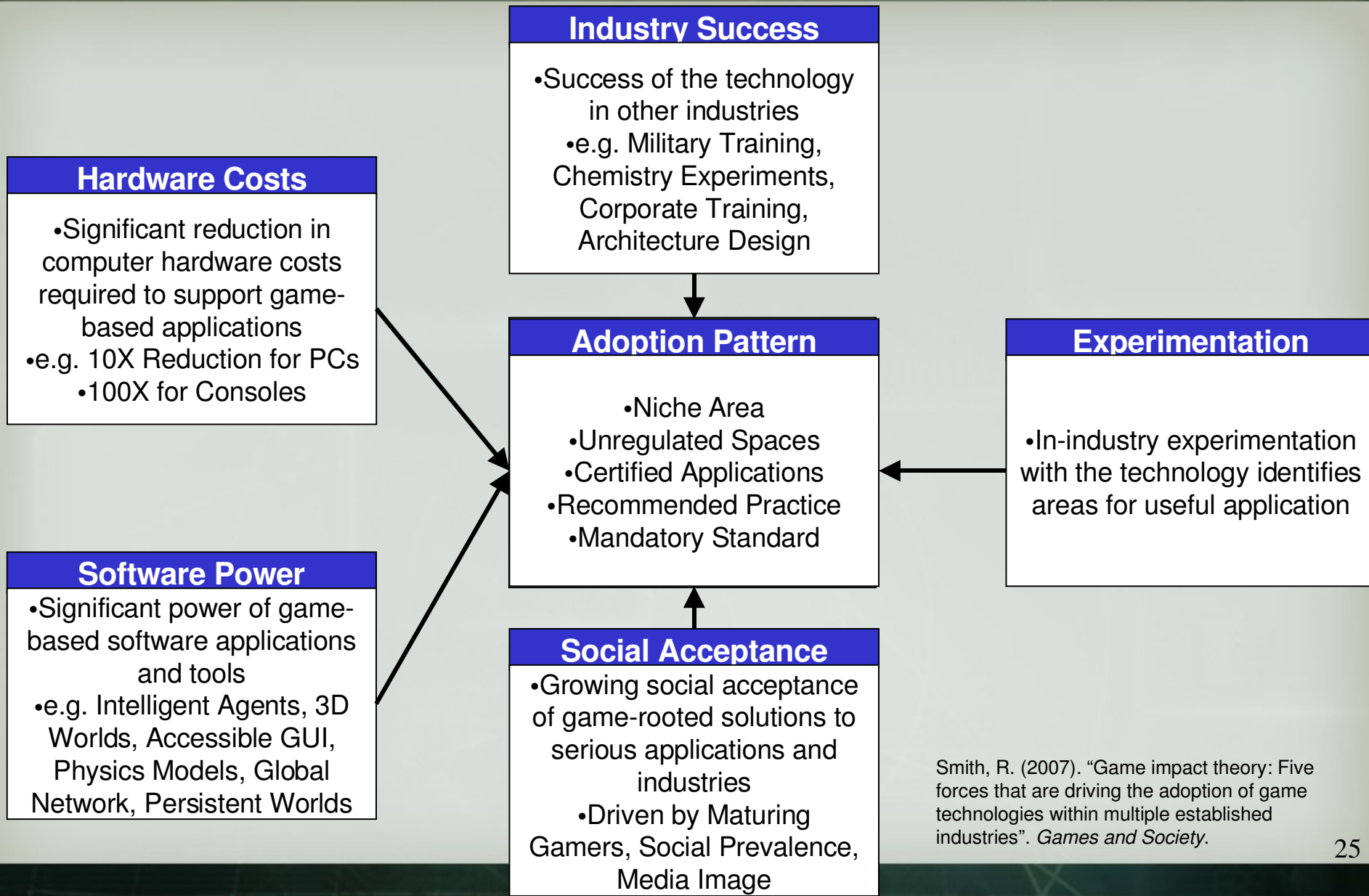
Ethics  
Culture  
Engine Repair

\$10K project





# 5 Forces for Game Adoption



Smith, R. (2007). "Game impact theory: Five forces that are driving the adoption of game technologies within multiple established industries". *Games and Society*.

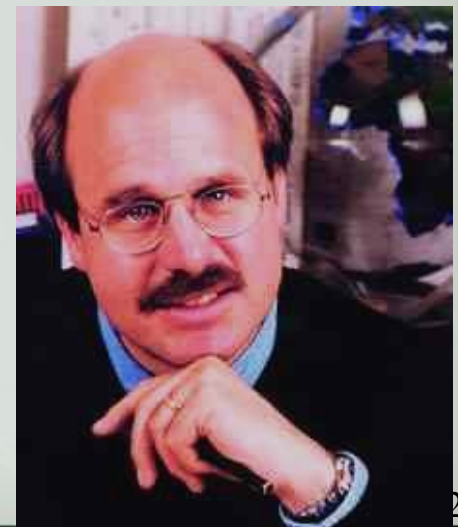
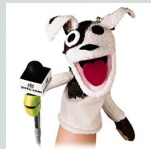
# How Close Are We?

***“Silicon Valley is littered with the corpses of companies who mistook a clear view for a short distance.”***

“One of the secrets in my business is that everything changes slower than people imagine. Change only seems fast because people overlook the antecedents. Most ideas take 20 years to become overnight successes.”

Paul Saffo. (July 16, 2007).

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# Questions?



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