

# **Delta3D and Open Source Software**

## **Defense GameTech Users Conference**

**April 29, 2008**

**Perry McDowell**

**Executive Director, Delta3D**



# Built at the MOVES Institute

- Part of the Naval Postgraduate School
- MOdeling Virtual Environments and Simulation
- A cross-disciplinary approach involving mainly CS, OA and HCI
- Academic view of building, using and evaluating training systems



# MOVES Institute

- Probably most famous, in the game world, for America's Army, which was created and produced through March 2004 at MOVES



# MOVES Students

- One of the biggest advantage of the MOVES Institute is its students – military officers, normally with 5-12 years experience in a warfare area
- Their experience prevents MOVES from building systems that make sense in the “ivory tower” of academia, but not in the field



"A hiatus exists between inventors who know what they could invent, if they only knew what was wanted, and the soldiers who know, or ought to know, what they want, and would ask for it if they only knew how much science could do for them. You have never really bridged that gap yet."

-- Winston Churchill, The Great War

Our mission at MOVES is to bridge this gap.

We combine warfighting expertise with technical expertise towards *relevant, cost effective, sustainable* solutions.



# Use Our Students

- Each of our students does a thesis
- Some come in with solid ideas, but most are looking for topics
- Give us potential thesis ideas, and we will try to match with students
- Caveat: We don't force our students into a given thesis



# Delta3D



# One Example We've Experienced

- In 2002, two USMC students built a forward observer trainer for their thesis
  - Built on a massive proprietary infrastructure
    - Required both engineering and run-time licenses
- PM-TRASYS was interested in fielding the trainer, but couldn't afford the run time licenses



# Genesis of Delta3D

- 90-95% of most image generation systems are essentially the same – they have effectively become commodities
- Vendors don't charge commodity prices
- Quite often, you don't want the differences
  - They're on the "bleeding edge"
  - Require the best/newest hardware



# Wanted: Cheap, Easy to Use System to Build Training Applications

- No free/cheap software came close to meeting requirements
- No open source solutions that fully met requirements
  - Lots of OS software that partially met requirements, though
- Used those to build Delta3D



# I Know What You're Thinking

Why are we wasting our time talking about Delta3D when the solution to all the military's training needs are going to be met with Real World?

I hadn't been to Bubbalou's in way too long, so I begged Leslie and Kristi to put me on the agenda.



# The 800 lb Game Gorilla - Real World

- \$40M funding from DARPA
- Does everything for everybody
- Really intended to create tools to allow training sims to be created easily w/o engineers
- Modular???



# But, Wait, You're Biased...

- We've seen too many people/ companies angry about new product
- Don't view Real World as a competitor to Delta3D
  - Running software programs is not what we want to do
- REALLY hope it succeeds
  - We all have the same goal - helping the warfighters
- We would love to return to JUST building and evaluating apps



# Worries About Real World

- They are claiming all sorts of apps as “Real World Apps” which aren’t
  - Anything built with Gamebryo in the last five years is being touted as a “Real World App”
    - RW logo added to existing apps



# Real Worries About Real World

- Licensing costs
- Access to source code
  - All underlying libraries?
- Library updates
  - Need significant improvement approximately every two years



# Real Worries About Real World

- Long term costs
  - Expecting a “sugar daddy” (SOCOM???) to come along and pick up is not a plan for maintenance and upkeep
- Long term maintenance/additions
  - He who pays the bills makes the decisions
- These questions are leading...



# Military Moving to Open Source

- OTD Report for DUSD-Advanced Systems and Concepts
- Price is an important, but not key, factor



## Roadmap Plan

April 2006

Prepared for:

Ms. Sue Payton  
Deputy Under Secretary of Defense  
Advanced Systems & Concepts  
[www.acq.osd.mil/asc/](http://www.acq.osd.mil/asc/)

Prepared by:

J.C. Herz  
Mark Lucas  
John Scott

Version 3.1 (Final)

Cleared for Open Publication, June 7, 2006  
Office of Security Review, Department of Defense

# Interesting Quote at I/ITSEC 2007

“Proprietary solutions are short sighted... proprietary is essentially an anathema to those criteria of responsiveness.”

-Dr. Paul Mayberry

Deputy Under Sec. of Defense for Readiness  
At the I/ITSEC 2007 Flag/General Officer Panel



# Interesting Quote at I/ITSEC 2007

“But the issue is right now, again, with proprietary is how you quickly turn to new, emerging, and changing problem sets. When I can only go back to one source and their sort-of dedicated workforce, it really is not getting at the fundamental criteria that we have for all of training transformation effects, and that is a notion of being agile, adaptive, responsive, timely and trainable.”

-Dr. Paul Mayberry

Deputy Under Sec. of Defense for Readiness  
At the I/ITSEC 2007 Flag/General Officer Panel



# Navy Moving to Open Source

**“The days of proprietary technology must come to an end,” he said. “We will no longer accept systems that couple hardware, software and data...”**

**“We can’t accept the increasing costs of maintaining our present-day capabilities,” Edwards said. “In the civilian marketplace, it’s just the opposite. Some private-sector concerns are cutting their costs by 90 percent while expanding their performance.”**

**-VADM Mark Edwards, DCNO for Comms**

**Navy IT Day, 3/5/08**



# Delta3D Overview

- Delta3D is an open source game and simulation engine
- Specifically designed for training apps and interacting with tools those apps use
- Built atop other open source projects
- Licensed under the Lesser Gnu Public License (LGPL) –not viral



# Delta3D Overview

- Delta3D is designed to be the “commodity” solution – it provides what is freely available and puts it in an easy to use API
- It is not intended to replace any of the AAAA game engines



# Interesting Quote

*"All the bells and whistles are nice and all, but ultimately you can create a great and unique ~~play~~ experience without them, which usually leaves me priced out."*

Anonymous game developer  
Reviewing the new consoles

Replace  
with  
**"TRAINING"**

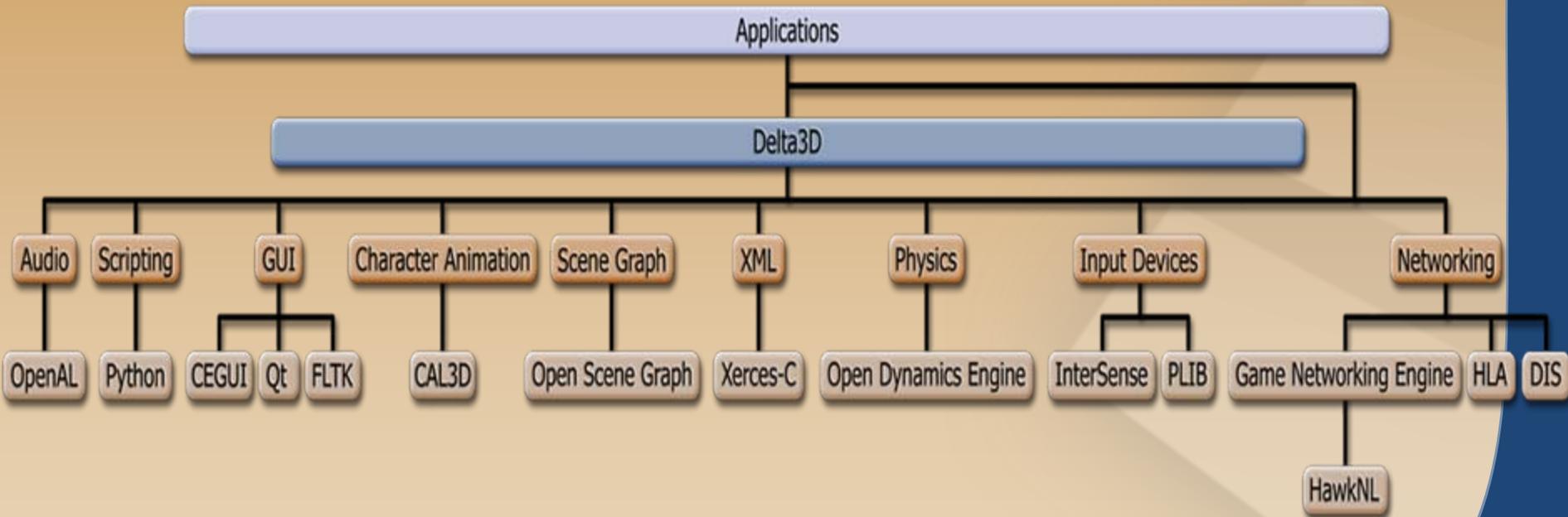


# Wanted: Cheap, Easy to Use System to Build Training Applications

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# Detailed Breakdown



# Four Design Tenets

1. Keep everything open to avoid lock-ins, lock outs and increase flexibility



# Lock In

- Getting locked in to one vendor is a bad business strategy
- By using a vendor's proprietary technology, no matter how good, the vendor has all the power when it comes time to renegotiate reuse
- Vendors don't want you to know about this



# Interesting Quote

“Since you own the IP, if the government wants to do a version two, they have to come back to you. So it guarantees you downstream revenue if they want to do a version two.”

Doug Whatley

CEO, Breakaway Games

Game Developer Magazine

Feb. 2005



# Lock Out

- Mentioned less often
- When a company goes out of business or decides not to support a crucial technology, what are your options?
  - Anyone using Windows 2000????

# Four Design Tenets

2. Make it multi-  
1 genre, even though we  
never know what  
app it's going  
to have to  
support next

# Military Motivation for Multi-genre Games

"I've got about 1500 different tasks I've got to train... If I have to pay a huge licensing fee for each of those, my entire budget is shot before I even begin building the first one."

- VADM Al Harms

Quoted when Commander, NETC

Does it make sense all 1,500 of those tasks are best trained using the same genre of games???



# Four Design Tenets

3. Make it modular  
so we can swap  
anything out that  
technology is  
making obsolete  
at different rates

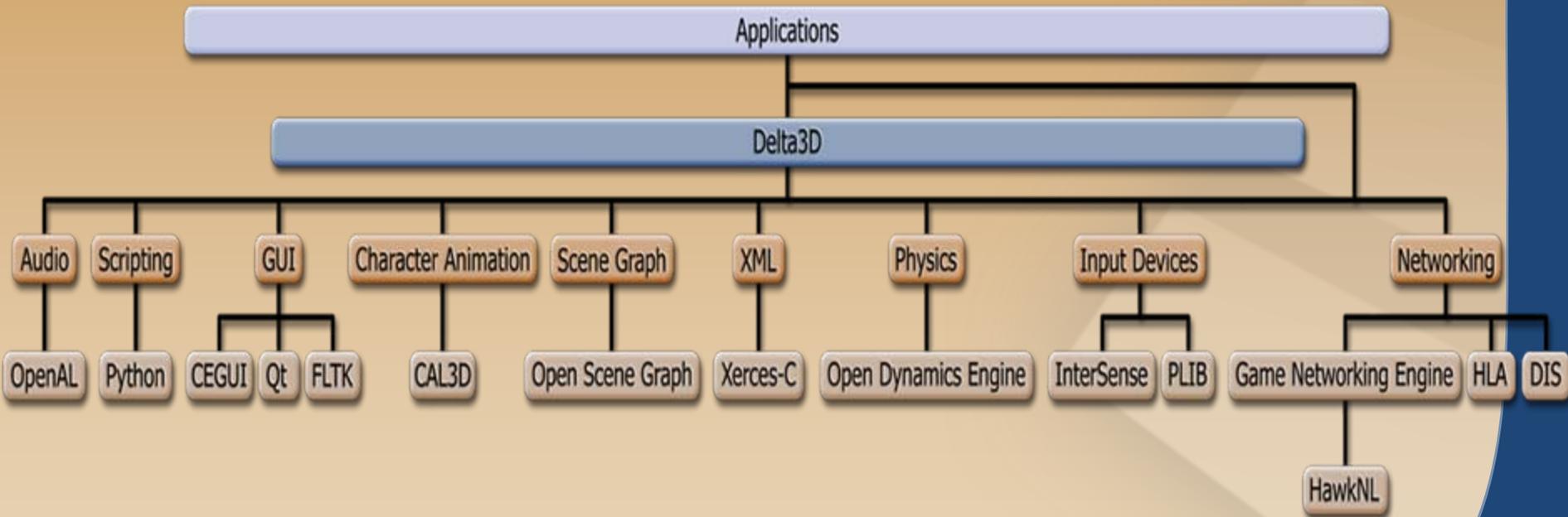


# Modularity

- Delta3D is made up of over ten other open source projects
  - They provide the engine's various functionality as the modules making up Delta3D



# Detailed Breakdown



# Modularity

- This means Delta3D will always be made up of the “best of breed” of the open source community
- It also means that proprietary modules can be swapped in as necessary
  - If the commodity open source solution doesn't meet user's requirements



# Four Design Tenets

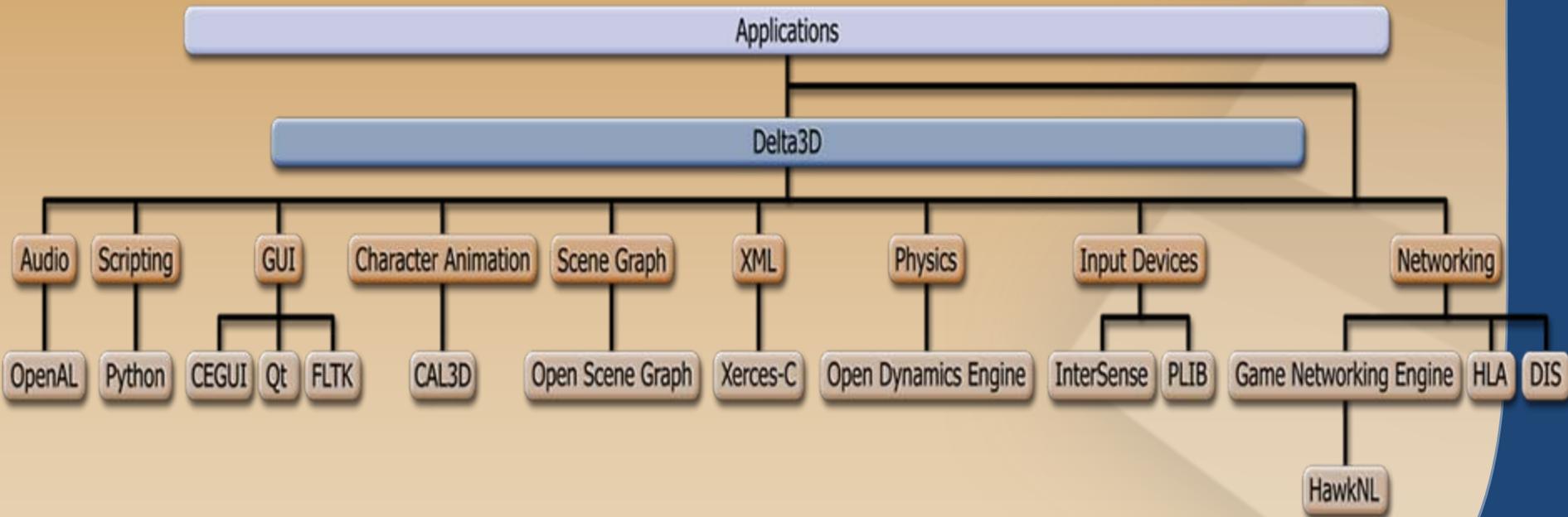
4. **Backed modular  
connectivity swap  
leverage existing  
technologies  
maturity doesn't  
have to pay for  
the bills**

# Importance of Community

- Because it's open source, Delta3D is improved by its developers
- All submitted code is reviewed by team of government employees before it enters the engine to verify it works and is not a security vulnerability



# Detailed Breakdown



# Importance of Community

- Because it is composed of many open source projects, every improvement to those projects also improves Delta3D

- Creates literally tens of thousands of developers for Delta3D
- All unpaid

**IT  
UPDATES  
ITSELF!!!\***

**\* - Okay, it's not that easy, but almost!!**



# Importance of Community

- Additionally, as more applications are built using the engine, additional functionality is added, e.g.:
  - LMS Integration
  - AAR Additions
- User pays ONCE for these improvements, and all future users benefit from them



# Community Includes Many in Industry



# Four Design Tenets

1. Keep everything open to avoid lock-ins and increase flexibility
2. Make it multi-genre since we never know what app it's going to have to support next
3. Make it modular so we can swap anything out as technologies mature at different rates
4. Build a community (or leverage existing ones) so the military doesn't have to pay all the bills



# Delta3D Features

OpenGL 2.0 Rendering

Cross-platform

Realistic Physics

HLA/Game/DIS Networking

Character Animation

Multiple File  
Formats (AAR, K&P,  
Revit, etc.)  
Realistic Physics  
(Environment, on  
Maya, OpenFLt)  
System Creator)

Multiple File Formats

AAR Capability

Python Scripting

LMS Integration

Game Manager Controls

Advanced AI Framework

Multiple Tools







Humvee0\_Drvr

Health 1000

A small gauge with a red needle and a scale from 0 to 1000, indicating the player's current health level.

GPB

32,000 47,000

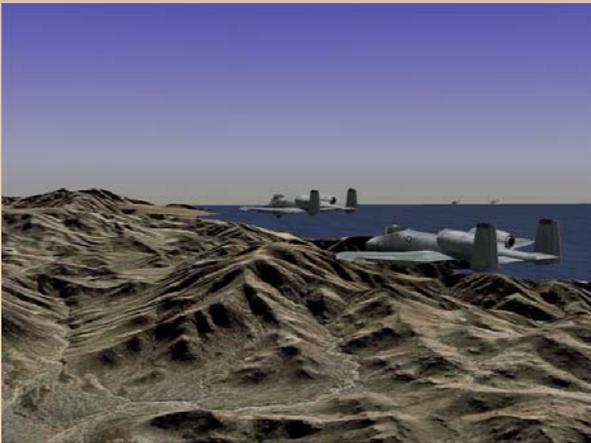
A gauge with two scales and a needle, likely representing a resource or currency (GPB). The current value is 32,000, with a target or maximum value of 47,000.

Health 100

A small gauge with a red needle and a scale from 0 to 100, indicating the player's current health level.

A circular speedometer with a needle pointing to 0 on a scale from 0 to 100. Below the gauge, the text "0 mph" is displayed.

# Wide Range of Applications



# Wide Range of Simulation Types



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