

Noise is Good for You!

Introduction to Sound Effects for Video Games

Presented at the August Twin Cities Chapter Independent Game Developers Association Meeting by Damian Kastbauer (LostChocolateLab)

Overview

Hi and welcome to an introduction to sound effects for video games. This isn't meant to be a comprehensive introduction to all aspects of sound as they relate to video games, but hopefully will give you a overview of some of the things you might give thought to during you game playing and creating.

Introduction

The seeds were planted early on, a penchant for experimentation, creative problem solving, a deep organizational psychosis, and unique ear for the world. Over the years it grew out of guitar based music steeped in effect pedal ethics, ambient experiments in feedback and noise, taken to the extreme with no-input pedal board noise feasts and finally ending up being implemented as sound effects in video games.

I look back over the development of sound in my life and it seems like such a natural progression.

At the crossroads of a career change I asked myself:

"Is there a place that will pay me for making weird noise?"

Like the Wizard of Oz, my world swiftly returned to the pixelated technicolor landscape of my youth where for days on end I was transported to alien lands, seeking untold fortune, submersed in a sonic landscape of squonking bleeps and squeeking blops, fending off challenge after challenge in an endless stream of disproportionately oversized end-bosses on my way to the goal that lie always just out of reach.

It was here that I could find my place in life...the decision was clear.

Since then it's been a steady stream of experience and hard work.

Late nights spent sculpting sonic goodness out of raw materials, coffee addled, sleep deprived, phasers set to kill. Sounds sourced from nature, molded by man & machine, the power of the universe unlocked in a waveform. This is what I'm thinking as the cacophony surrounds me in a womb of subterranean safety.

Brief History

While sound for video games will never be as visceral as the sound coming from a Frogger cabinet a dive bar in the 7th year of my life, I like to think that I continue to hear glimpses of that moment in the spontaneous noise feasts brought on by modern gaming. It may have started with a single sinewave triggered by the contact of ball on paddle, continued in custom synthesizers built into game computers, escalated to samples of increasingly more realism...but it will always be the part about games that suspends my disbelief, if for a moment. The sounds of the world have shut off, and here is a new world, with sounds not like those I'm used to.

Questions/Caveats

I'm not an expert, I don't know everything. I've been working with sound for video games a little less than a year. I've assisted on 15 projects, seen 6 through to completion, am currently working deeply on 3. I haven't developed for any platforms, I've never had to worry too much about file size, and I don't do music. Other than that, I am passionate about noise, sound effect implementation is the new experimental music for me, and I love working with creative people dedicated to their art.

Industry

Job Titles

Composer/Sound Designer: The eternal quest for a person capable of doing everything sound related on a given project.

This is a tough one out there today. In an industry that is still very much like the Wild West, it is hard to pin anyone down with the specifics of what they do. Assumptions are made, responsibilities flex and grow, roles are shared, budgets are cut, and all of a sudden everyone can make weird noises.

Some of the titles we'd like to see used would be:

Music Lead/Director/Manager: Scheduling, Budgeting, Overall Scope, Implementation

Composer: Someone who writes music.

Audio Lead/Director/Manager: Scheduling, Budgeting, Overall Scope, Implementation

Sound Designer/Sound Engineer: Creates with sound, Edits Sound

What I'd like to see more of is recognition of the different disciplines in game audio, and seeing the sound arts as equally valuable.

Work Flow

Pre-Production

Pre-production for audio, when does it start?

The easy answer is, when everything else does. Audio can be as integral to the game design as any other aspect of it's planning. Someone who follows the pre-development of a game has a chance to exact changes, or at least put up flags that may make for smoother implementation down the road. The point here is that making a game is usually a collaborative process, and the audio people (will) have as much invested as everyone else by the end of the project. Include them early and be rewarded.

Design Docs

Ground Zero

Brainstorming /Fuzzy Spec

This is the time when ideas get thrown around, a loose formulation of all aspects of game design are churning in an endless upheaval while attempts are being made to nail down what will make the game.

Questions you or your audio team might be asking during this phase might be:

What is the game trying to get across with sound?

In what ways could sound enhance game play?

What has been done before, what hasn't?

There's nothing radical here except for the idea that sound & music could contribute to a fuller gaming experience.

A ""Fuzzy Sound Doc"" could look like this:

1. Ambient Water

* Waves, splashes.

* Waves cracking the rocky coast (when it is rock).

* Running water, waterfalls.

2. Siege

* Onager moving.

* Onager being destroyed.

* Onager being selected. Possibly mixed with voices of Siege Engineers.

* Onager shooting (grinding and cranking sound of weapon being drawn back and prepared for attack).

* Onager reloading (sounds of stringing ropes and similar).

* Ballista shooting bolt.

* Ballista being selected. Possibly shared with Catapult.

* Ballista being destroyed. Possibly shared with Catapult.

* Ballista moving - Don't know if it will even roll, possibly pack and unpack.

* Ballista reloading. Possibly shared with Catapult.

Defining Assets

Kinds of Assets

Music, HUD/UI, Character, Ambient, Object, VO

Organization (Spreadsheet example)

Suggestions of what to track:

Group Name	/Folder Location	Description	Biome	Season	Time of Day	Intensity	Stereo/Mono
Duration	Loop	Random	Gain	Pitch	Pitch-Range	Entity	Action
Event Start	Event End	Priority	Assigned to:	Assign Date:	Status	Complete Date:	

Naming Standards (Relevance vs. size)

Ask for experience

Directory Structures

Storage/ Access

Logical Progression

Defining Tech

Audio Engines

Basics/ Examples/ Differences

An audio library is a software interface to audio hardware. The interface consists of a number of functions that allow a programmer to specify the objects and operations in producing high-quality audio output, specifically multichannel output of 3D arrangements of sound sources around a listener. Essentially a jump start on the low level functionality of the programming for an environment where sound plays a role. Audio engines deal with the playback, conversion, repetition, and other characteristics of the audio assets, as well as the way those assets react to the defined state of the listener.

Different Engines for different things;

OpenAL has a solid basis of limited, well defined parameters for open source platform independence.

FMOD includes similar standard definitions, but also includes more extensive DSP/ effects.

ActiveX/DirectX is Microsoft's proprietary audio engine.

Xact the Xbox Audio Creation Tool

Scream the Sony SCRiptable Engine for Audio Manipulation

Parameters

See O.A.D. Mock

Formats

Wav/Aiff
Mp3
Ogg
GMidi/ SPMidi
XMF

Streaming vs. Buffers vs. Sound Banks

Implementation I

Theory

Implementation is the way that sound is transferred from the static sound captured in a sound file, to the living breathing alternate reality that is the game world. This is as easy as a cause and effect relationship between two objects, and as difficult as the audio modeling of an object and the sounds it would create in realtime. Cause and effect, easy to explain: fire gun – hear shot. Beyond that there is a whole world of intricacies when you are dealing with the realistic playback of sound in an interactive environment. I stood and watched a Buffalo idling in a field eliciting no less than 5 individual sounds, just standing there.

1. Panting in the hot sun.
2. Movement
3. Tail Wagging
4. Grass Chewing
5. Grunting

Then there was the flies buzzing, the bird sitting on his back pecking the bugs off, and the sound of the wind in the tree's. To attain a truly realistic representation of that scene would require 8 types of sounds, with variation plus randomization and then there's making sure they play at the right time. That is implementation; the dissection of a sound scene and the way you go about reproducing it interactively and believably.

Trigger/ Rollover/ Zone

How do we accomplish this? We've got our afore mentioned parameters, there's what we can bake into the sound file itself, and then there are the action/ reactions in-game that can act as our cause and effect.

Trigger: A location or event based call for action. Can be placed directly on a map or in a sequence of events, and will then play back the associated audio file.

Rollover/ Mouse over: Another kind of trigger. Like on a website where a cursor moves over the top of a graphic or location and a sound is triggered.

Zone: Zones allow for different area specific sounds tied to locations on a map. An example would be footsteps. If the player is walking on the beach in the zone associated with sand then play the "sand footstep" sound, if they walk out into the lapping waves of the water zone play "water footsteps". In this way you can define different sounds for the same action based on the map location or in this case material represented.

One Shot/ Looping

XML/ IXML

Extensible Markup Language. I am not the expert, but I see this as an easy way to deal with the process involved with the programming of events in relation to objects and entities that interact. XML provides an assignable common language that can be used for the programming of events.

Integrators

iMUSE, GameCODA, EAGLE, EAX

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- Common Words/ Concepts

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- Theory

- Trigger/ Zone/ Rollover

- One Shot/ Looping

- XML/ IXML

- Integrators

Production

Asset Creation

Techniques

Foley

Synthesis

Editing

Manipulation

Implementation II

In-Game Feedback

Adjustments/ Parameters

Team Work

Management

Communication

Techniques

Tools

People

Play the Game

Work Together

Challenge Each Other

Examples

Playful Minds

Elemental Wars

Basic Trigger/ Buffer Limitation

Castle Cards

Multiple Animation Trigger

Valandil

HL2 Engine/ SDK & Scheme

0.A.D.

Priority

Intensity

Tools

XML

Scripts

Closing

Questions

SFX Drama Reinactment

Hero

Steps grass the gravel
Add armor
Unsheath sword
Whip around
Dragon walk/ growl
Whip/slice flesh impact
Dragon Death yell
Triumph sound

Shooter

Steps
Unholster
Check clip
Fire
Ricochet
Impact/flesh
Death yells
Broody ambient

Bring:

Audio recording Equipment
Paper Handouts 11X17 (Color)
Audio Engines
Web Links/ Resources
Formats

CD's of Clint Bajakian Speech
Books

Vocal Assets
Game Videos
Quicktime