SOUND IN GAME DESIGN

Phil Jackson

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SOUND IN GAME DESIGN

- HISTORY OF GAME AUDIO
- GAME AUDIO PRODUCTION
- SOUND DESIGN AND SCORING
- FOLEY
- MUSIC CREATION SOFTWARE
- MIDDLEWARE FOR AUDIO


SOUND/AUDIO

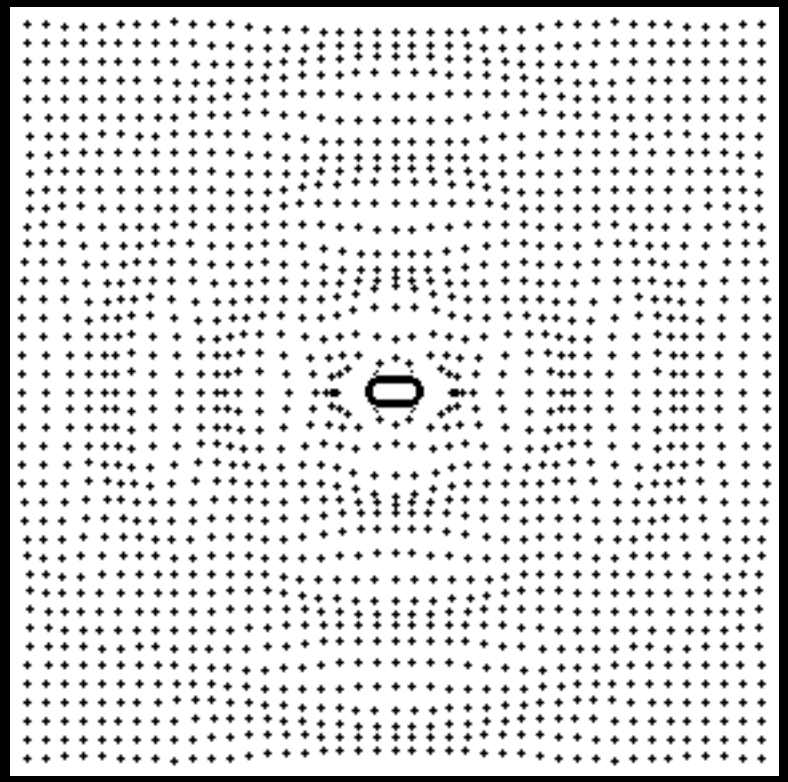
SOUND VS AUDIO IN GAME DESIGN

SOUND

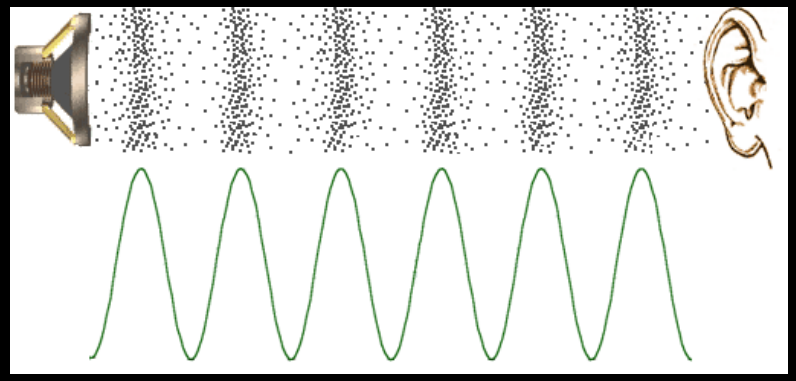
- ANYTHING AUDIBLE FROM ANY SOUND SOURCE

AUDIO

- SOUND EMITTED FROM A DIGITAL SOURCE



Sound



Audio

Where is sound heard in a Game?

- Interface sounds
- Music (Score)
- Sound Effects
- Dialogue
- Ambience

All of these can function on several layers (like diegetic/non-diegetic)

Who makes it?

- Sound Director
- Composer (Music)
- Sound Designer (FX)
- Programmer/Engineer
- Dialogue/VO director, actors
- Licensing/Contracting director

Audio (post) Integration

- Sound design, mixing, integration typically handled by the same person.
- Director/designer must make decisions regarding implementation of all audio assets (including music)
- Often is a programmer as well

Audio in design process

- **Sometimes at start or in middle:** play a larger role in implementation of audio in the game, and can make critical decisions in regards to the development of the game and its sound
- **Sometimes at end of game:** populate game with sound

Audio in design process

Spotting: Sitting down with the game designer and:

a) Planning where audio/music/sound effects will be required in the game and
b) What the sound/audio will consist of.
c) Consider all elements eg. Main environment sounds, character sounds (eg. clothing, weapons etc)
d) Consider any dialogue spoken

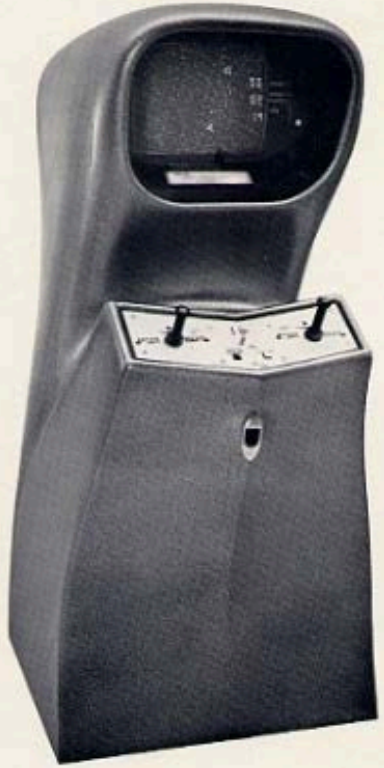

HISTORY OF
GAME AUDIO

History of Audio in Games

Computer Space! (1971) First game to have sound.

DOUBLE PROFITS —
DOUBLE FUN
NEW! 1 AND 2 PLAYER

Computer Space



- Choice of 1-player or 2-player action at the push of a button.
- 2-Player competition pits players against each other to maneuver their Space Rockets and destroy before being destroyed.
- Single players battle against computer-programmed Space Saucers by skillful guidance of the Space Rocket and firing missiles to destroy the Saucers.
- Most competitive and fastest action of any video game ever.
- Players play again and again. High profits from proven locations.

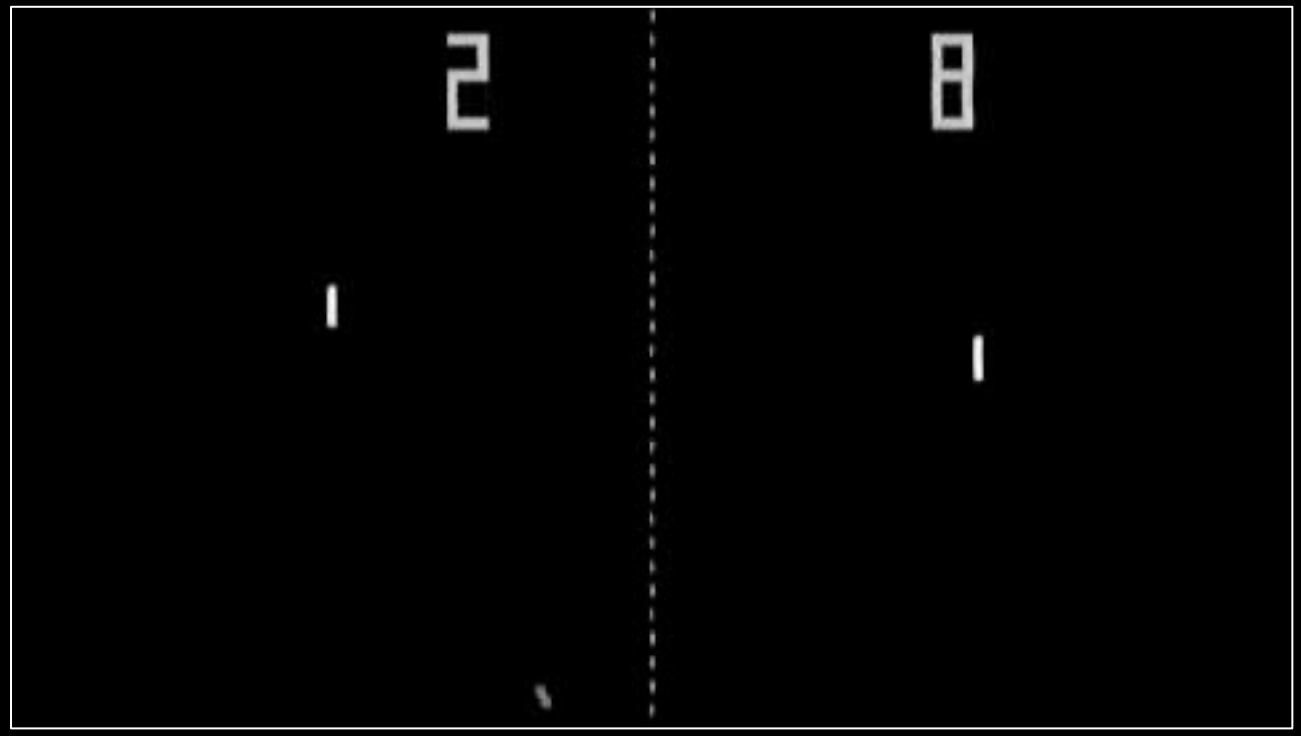
- 25¢ PLAY—for more profit.
- NEW CONTROL STICKS—Fast, natural action.
- SPACE BATTLE SOUNDS—Rocket and thruster engines, missiles firing, explosions.
- ATTRACT MODE—Two Space Saucers fly continuously across the screen.
- SOLID STATE, long life computer.
- BEAUTIFUL SPACE-AGE CABINET
- EXTENDED PLAY, for high score in 1-player mode.
- ADJUSTABLE TIME—1 minute to 2½ minutes.
- EASY SERVICE—Built in test pattern and plug-in circuit boards.
- SIZE—67" High, 30" Wide, 29" Deep. Shipping Weight—160 lb.

NUTTING ASSOCIATES

500 LOGUE AVENUE, MOUNTAIN VIEW, CALIFORNIA 94040 415-961-5373

History of Audio in Games

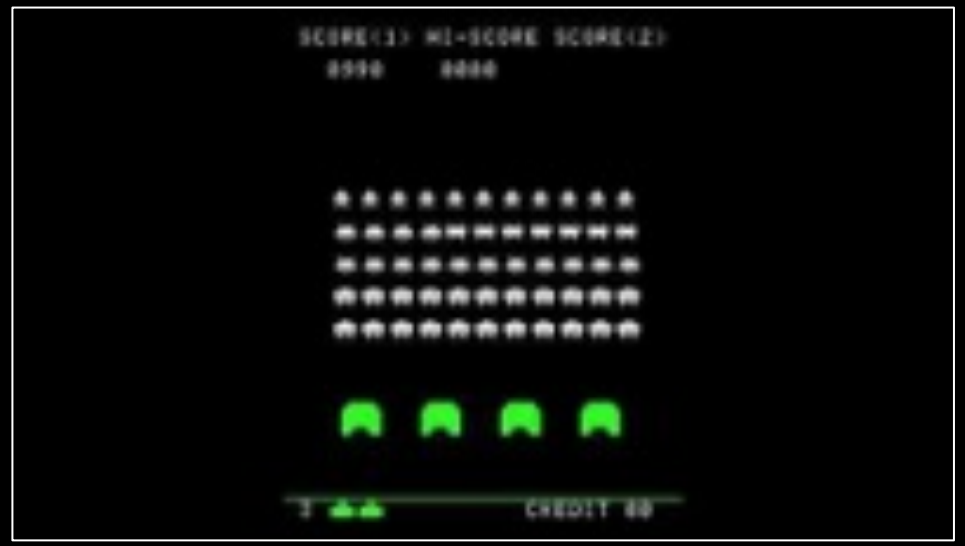
- Pong (1972)
- The first commercially successful video game
- Helped to establish the video game industry
- Many imitators



Pong 1972

History of Audio in Games

- Space Invaders (1978)
- First use of continuous “background” music.



History of Audio in Games

NES SYSTEM

NES (Nintendo Entertainment System) 1985

History of Audio in Games

CHIPTUNE MUSIC

- Mario Brothers (1985)
- All sounds on the tiny computer chip
- Used the NES System
- Stuck to 5 sounds

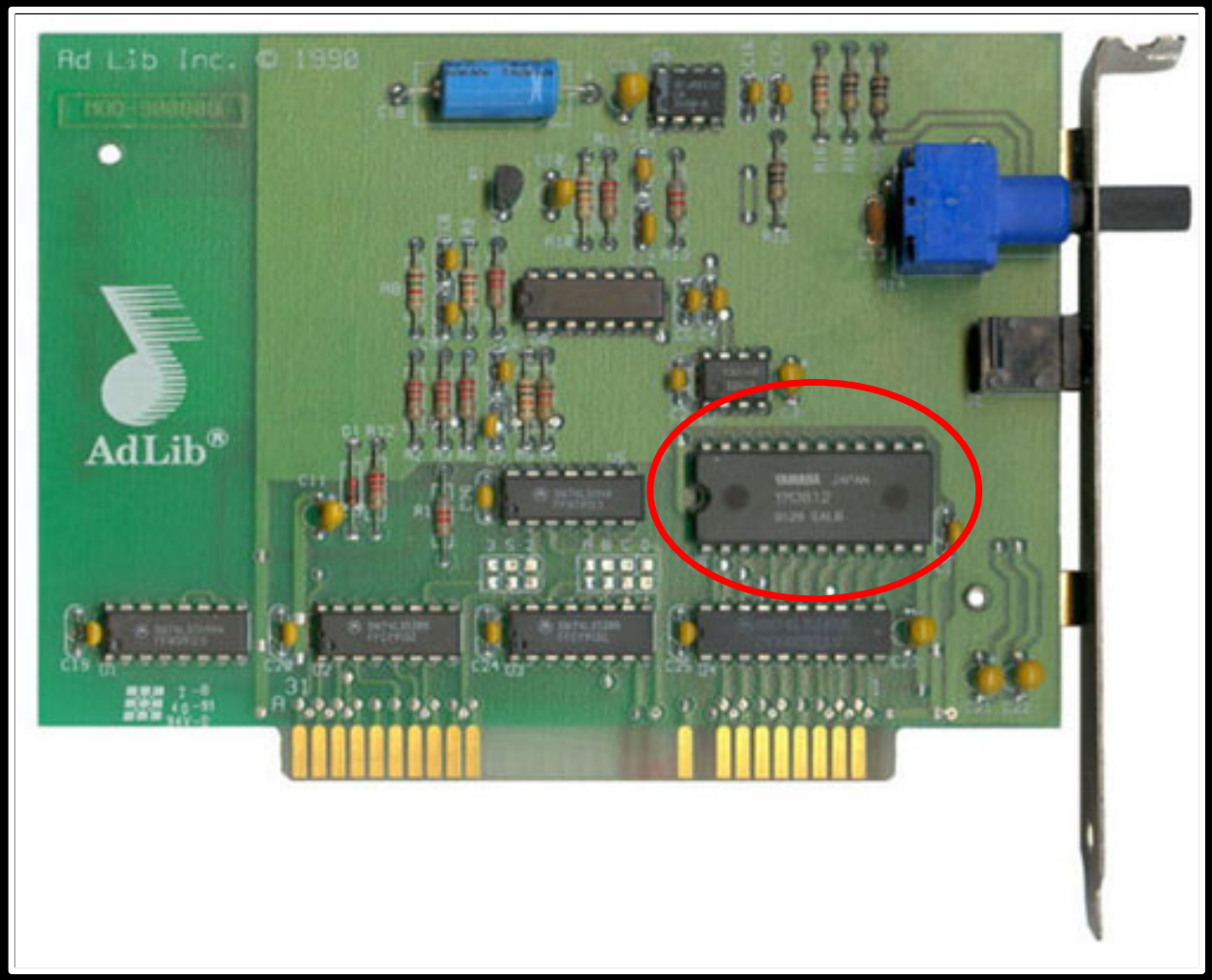
History of Audio in Games

CHIPTUNE MUSIC

- Commodore 64 (1980s)
- Ron Hubbard UK composer
- Cult status

History of Audio in Games

- PC Soundcards (1987)
- FM Synthesis



AdLib’s card relied on the Yamaha YM3812 FM synthesizer chip

History of Audio in Games

PCM Sample - 1992

- Real sounds sampled
- Rough edge to the sounds
- Repetitive and not very realistic
- Cutting edge at the time

Mortal Combat 4 1992

History of Audio in Games

To the present day…

- 1989 Nintendo Gameboy
- 1990 Nintendo Super Famicom 16bit
- 1995 SEGA 32 bit console
- 1995 Sony Playstation 1 32 bit.
- 1996 Nintendo 64 bit
- 1999 Dreamcast 128 bit
- 2001 Xbox 1 - 200MHz bandwidth
- 2020 Xbox X – 4k, 120fps
- 2020 Playstation 5– 4k, 120fps

Psychology of Sound

WHY IS MUSIC IMPORTANT?

- Can control emotion
- Build Pace
- Allows for an immersive experience
- Can captivate the player

Psychology of Sound

AN AUDIO ENVIRONMENT

- Called Ambient music
- Sets the ambience/feeling
- Not part of the gameplay
- Adds to level of realism
- Adjusts mood


GAME AUDIO
PRODUCTION

AUDIO PRODUCTION

TECHNIQUES BORROWED FROM FILM

- Spotting a game
- Emotional reinforcement
- Use of sound FX libraries
- Field recording techniques, Foley
- Mixing of cutscenes/cinematic sequences
- Using multichannel surround*
- Certain techniques from, for instance, Ride
- films—e.g. Prominent sub-woofer, etc.
- —”physicality” of sound to shock and awe

AUDIO PRODUCTION

TECHNIQUES BORROWED FROM FILM

- Balance: among and between elements— can’t understand dialogue through music, explosions, etc.
- Intelligibility
- Believability: realistic and emotionally effective reduces illusion; characters for instance suddenly come in much more clearly, or too loud, etc.

AUDIO PRODUCTION

WHERE GAMES DIFFER FROM FILM

- Linearity Vs. Non-Linearity/ unpredictability
- Interactivity and player/ multiplayer
- Temporality (length)
- Budgets
- Delivery methods/technology
- Listening environment

DYNAMIC AUDIO

INTERACTIVE AUDIO

- Sound events occur in direct reaction to a player's movements.
- The player triggers the cue, and can repeatedly activate it, such as by making a character jump up and down.

DYNAMIC AUDIO

ADAPTIVE AUDIO

- “Adaptive” audio is generally referred to as sound that reacts to transformations in the gameplay environment—such as moving from scene to scene.
- Adaptive audio is not directly triggered by a player

DYNAMIC AUDIO

ADAPTIVE AUDIO

- **HORIZONTAL RE-SEQUENCING** pre-composed segments of music can be re-shuffled
- **VERTICAL SEQUENCING;** separate parts of an ongoing loop of music in relation to a player's movement within the narrative of a game

DYNAMIC AUDIO

PROCEDURAL GENERATION OF MUSIC:

USING STEMS

- **HORIZONTAL RE-SEQUENCING** pre-composed segments of music can be re-shuffled
- **VERTICAL SEQUENCING;** separate parts of an ongoing loop of music in relation to a player's movement within the narrative of a game

DYNAMIC AUDIO

ALGORITHMIC GENERATION OF MUSIC:

- Automatically generate music on the fly


GAME SOUND
DESIGN AND
SCORING

GAME SOUNDTRACK

- MUSICAL SCORE
- AMBIENT MUSIC
- SOUND EFFECTS/FOLEY (SOUND DESIGN)

MUSICAL SCORE

- Creates a mood or emotion
- Creates a sense of time or place
- Represents a character
- Preempts what’s about to happen
- Created with samples or live orchestra

MUSICAL SCORE

Connectable Musical “Blocks”

- **INTRO** – Sets the mood
- **LOOP** – Short repeatable section
- **TRANSITION** – connecting music
- **STINGER** – Represents important events
- **TAG** – short piece signals the conclusionof a level or section

FOLEY

- Creating sounds for games
- Using everyday items - not created digitally
- Hours of recording
- Many variations required

FOLEY

HOW TO CREATE:

Wooden Creaks - old chair
Fire – cellophane
Footsteps in snow – cornstarch in leather bag
Body hits – phone book
Bullet surgery – tomato!
Gun Handling – Caulking gun

This is the foley re-design for a cut scene from God Of War 2018

FOLEY

- Build your own foley pit
- Garden tray
- Sound dampening

https://youtu.be/zO2hx7iToNY

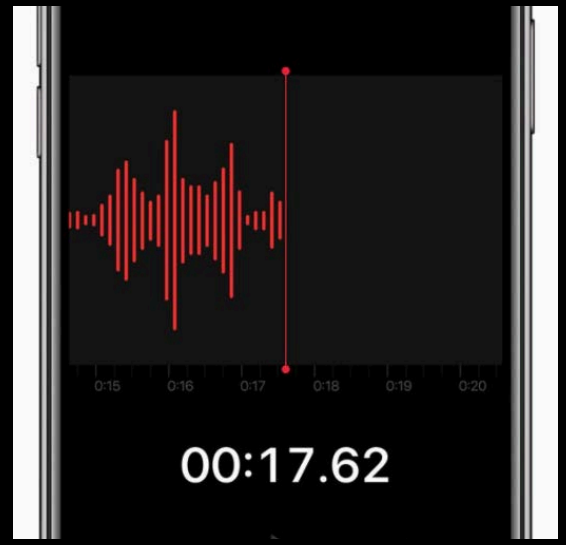
FOLEY

How to Record – On a Budget

- **INDOORS** – Condenser mic
- **OUTDOORS** - directional – only capture what you need.
- Memo app on phone

Tascam Stereo £70
(Zoom H4n Pro - £230)

About £80



Free – Memo app on phone

SOFTWARE

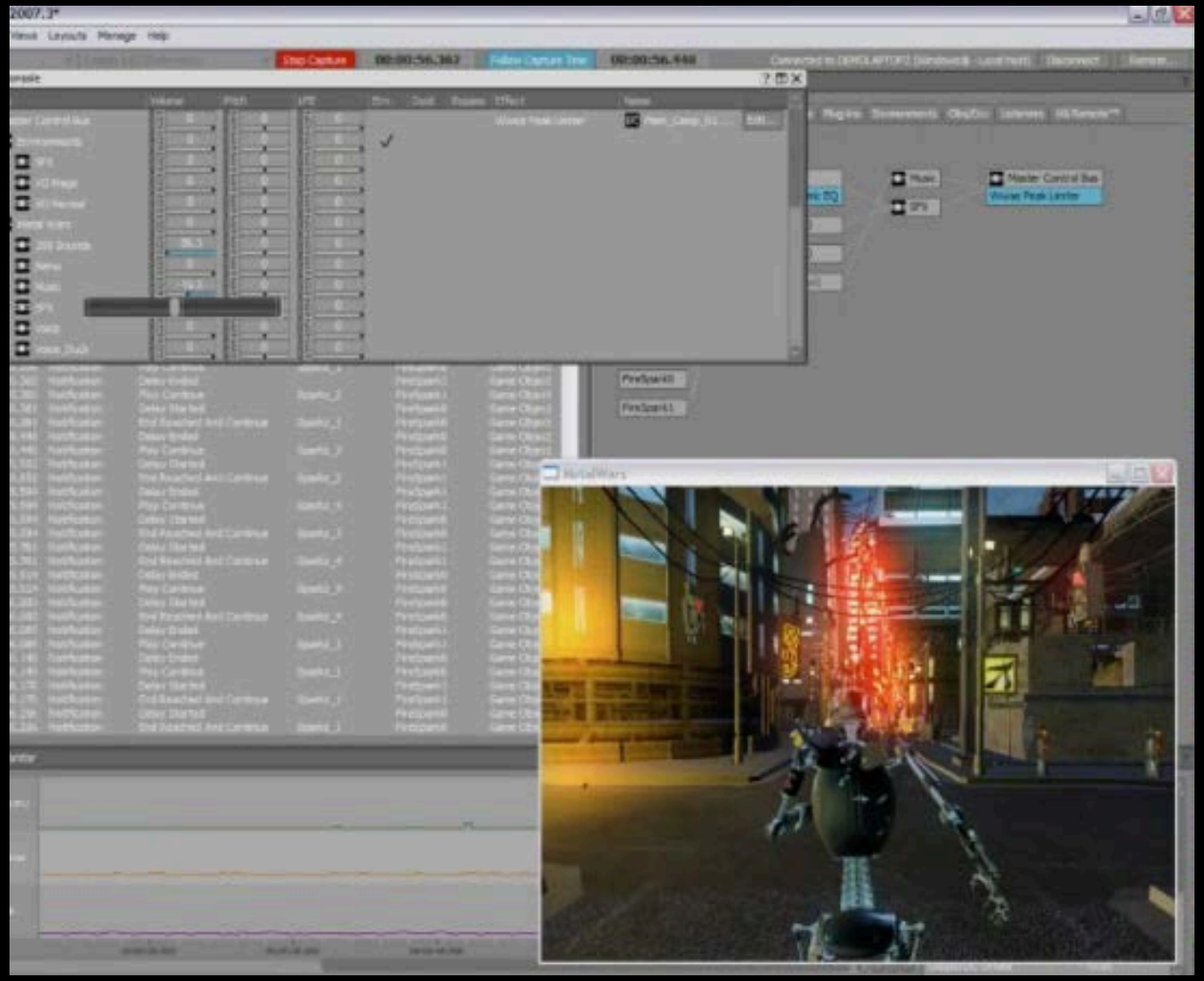
How to Record –
On a Budget

- **Audacity** - Windows/Mac FREE
- **Garageband** – Mac FREE
- **Reaper** - Windows/Mac £60
- **Cubase** - Windows/Mac £50
- **Sonar** - Windows - £50
- **Adobe Audition –** Windows/Mac - Subs
- **Logic Pro X** – Mac £200
- **Pro Tools** – Windows/Mac – Starts £25/Mo

MIDDLEWARE

Sits between your DAW and game engine:

- Wwise
- FMOD
- Fabric



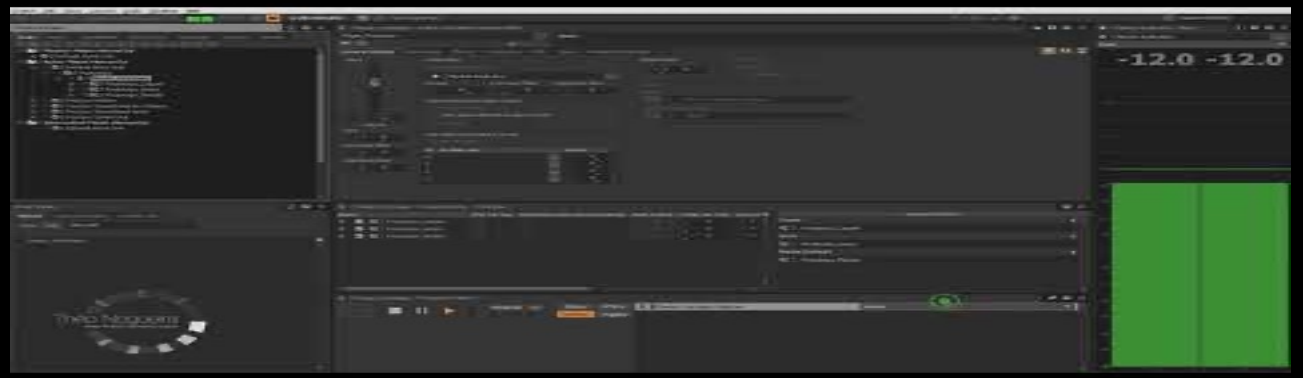
fmod Wwise Fabric

MIDDLEWARE

How can it improve the game experience:

- CREATING ORGANIC SOUNDS
- MULTIPLYING AND DIVERSIFYING FOOTSTEPS
- MAKING AMBIENCE MORE REALISTIC
- COMPLEX AND LONG DIALOGUE SCRIPT

Space Racer Engine



Footsteps

Ambience