<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Lecture</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Wed Sept 03</td>
<td>13-15</td>
<td>1</td>
<td>Intro</td>
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<tr>
<td>Fri Sept 05</td>
<td>15-19</td>
<td>2-3</td>
<td>Group Formation</td>
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<tr>
<td>Wed Sept 10</td>
<td>13-15</td>
<td>4</td>
<td>Proposals</td>
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<tr>
<td>Thu Sept 11</td>
<td>10-12</td>
<td>5</td>
<td>Feedback on proposals</td>
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<tr>
<td>Mon Sept 15</td>
<td>8-10</td>
<td>6</td>
<td>Hello World! Demos</td>
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<tr>
<td>Thu Sept 18</td>
<td>10-12</td>
<td>7</td>
<td>ForskarFredag Preparation</td>
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<tr>
<td>Wed Sept 24</td>
<td>14-16</td>
<td>8</td>
<td>Demo Day!!!</td>
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<tr>
<td>Thu Sept 25</td>
<td>16-20</td>
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<td>Debaser Invitation</td>
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<tr>
<td>Fri Sept 26</td>
<td>8-18</td>
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<td>Debaser Domination</td>
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<tr>
<td>Mon Sept 29</td>
<td>8-10</td>
<td>9</td>
<td>Reflections of ForskarFredag</td>
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<tr>
<td>Wed Oct 8</td>
<td>13-15</td>
<td>10</td>
<td>Agile Development</td>
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<tr>
<td>Mon Oct 13</td>
<td>8-10</td>
<td>11</td>
<td>Agile Development 2</td>
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<td>Wed Oct 29</td>
<td>16-23</td>
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<td>Kistamässan Invation</td>
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<td>Kistamässan Domination</td>
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<td>Sun Nov 2</td>
<td>9-19</td>
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<td>COMICON 2014!</td>
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<td>Tue Nov 4</td>
<td>10-12</td>
<td>13</td>
<td>Reflections on ComiCon</td>
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<td>Wed Nov 5</td>
<td>10-12</td>
<td>14</td>
<td>New groups</td>
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<td>Fri Nov 7</td>
<td>15-19</td>
<td>15-16</td>
<td>Epson Moverio Workshop</td>
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<tr>
<td>Tue Nov 11</td>
<td>10-12</td>
<td>17</td>
<td>Proposals</td>
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<tr>
<td>Tue Nov 18</td>
<td>10-12</td>
<td>18</td>
<td>Feedback on proposals. Early hello world demos</td>
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<td>Tue Nov 25</td>
<td>10-12</td>
<td>19</td>
<td>Hello world Idemos</td>
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<td>Tue Dec 2</td>
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<td>Fri Dec 5</td>
<td>15-19</td>
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<td>Prepare Open House</td>
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<td>Open House</td>
<td>AGI14-VIC Open House</td>
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</tbody>
</table>
Agenda

• Format (starting at 13:15 sharp)
  – Presentation (10 minutes) - Template Slides.
  – Discussion (10 minutes)
  – Context Switch (1 minute)
   – Stefan
   – Johan B.
   – Oscar
2. Leonardo (13:40 - 14:00)
   – Carl
   – Anton
   – Johan S.
• Break
3. Donatello (14:15 - 14:35)
   – Søren
   – Philip
   – Daniel
   – Axel
4. Megatron (14:36 - 14:56)
   – Christoffer
   – Mattias
   – Ludwig
   – Linnea
• Next Lecture (14:57 - 15:00)
  – Assignment 2
Michelangelo

• Stefan
• Johan B
• Oscar
Space Survival

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Oscar Friberg
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Johan Bäckman
johba@kth.se

Advanced Graphics and Interaction
AGI14
2014/09/10
Space Survival
Motivation

- Further development opportunities
- Challenge to combine multiple interactive devices
- Cool immersive experience
- Experience outer space!
- Save dollars and make space training easier and better
- Space is fun.
Goals and Challenges

• Avatar arms corresponding to physical movements
• Achieving realistic physics
• Believable graphics & an immersive world
## Related Work

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Year</th>
<th>Published in</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Virtual Reality: Avatars in human spaceflight training</strong></td>
<td>Lawrence, B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Creating Next-Gen 3D Interactive Apps With Motion Control in Unity 3D</strong></td>
<td>Pleemmons, D.</td>
<td>2014</td>
<td>SIGGRAPH 2014 Workshop</td>
</tr>
<tr>
<td><strong>Creating Next-Gen 3D Interactive Apps With Motion Control in Unity 3D</strong></td>
<td>Holz, D.</td>
<td></td>
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</tr>
<tr>
<td><strong>VR Simulation System for EVA Astronaut Training</strong></td>
<td>Liu, Yuqing. et. al.</td>
<td>2010</td>
<td>AIAA SPACE 2010 Conference &amp; Exposition</td>
</tr>
<tr>
<td><strong>VR Simulation System for EVA Astronaut Training</strong></td>
<td></td>
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</tbody>
</table>
Control VR (Control VR)

- https://www.youtube.com/watch?v=KkPjLBxYoQ&feature=youtu.be&t=1m10s
Spacewalk (Richard Emms)

- https://www.youtube.com/watch?v=bg7Sm6fF8vg
Chilling Space (RiftAway)

- [https://www.youtube.com/watch?v=vvd9HwZfl6U](https://www.youtube.com/watch?v=vvd9HwZfl6U)
Methods and Techniques

• Wii Remotes and Nunchucks – UniWii-plugin
• Oculus Rift
• Blender
• Unity 3D (C#)
Wii Remotes & Nunchucks
Oculus Rift
Blender
Unity
Thank you!

Questions?

Stefan Etoh, IMT {etoh@kth.se}
Oscar Friberg, IMT {ofri@kth.se}
Johan Bäckman, IMT {johba@kth.se}

Mario Romero {marior@kth.se}
FEEDBACK TO SPACE SURVIVAL
SPACE SURVIVAL

UNITY PRO LICENSE - NEED IT?  YES  OCCULUS
PLUGINS

FOCUS: 1 INTERACTION  INVERSIVE
2. GRAPHICS

TURN? MOVE? (SPACE) PUSH?

TRAINING? EXPERIENCE. (OWN RULES)

JET PACK?

SPACE PHYSICS ARE ODD!!

WILL ROCKS MOVE?

SPIN? ANGULAR MOMENTUM?

IN ROOM W/ G? WHAT IS THE SETTING?

WALLS

END STATE

WORK LOAD

OSCAR - UNITY

STEFAN

JOHAN
Leonardo

• Carl
• Anton
• Johan S
Project Proposal

Carl Ahrsjö
ahrsjo@kth.se

Anton Warnhag
awarnhag@kth.se

Johan Storvall
johansto@kth.se

Advanced Graphics and Interaction
AGI14
2014/09/10
Dual Engine VR Racing
Motivation

• Why is this project interesting?
• What do we want to learn by doing this project?
• Why does the world need this project and how does it make the world a better place?
Goals and Challenges

• Goals
  – Immersive, first person view experience of VR racing at high speed
  – Rendering a huge world/track for racing around in/on
  – A fun steering method with two “engines” (NovInt Falcons) providing useful haptic feedback
  – Fire particle system

• Challenges
  – Real time rendering as you race through the world/track
  – Making the haptic feedback realistic and useful
  – To not burn out the motors of the Falcon as you get caught up in the game
  – Development support for the Falcon can be hard to find
Related Work

• Interactive Racing Game with Graphic and Haptic Feedback
  – Sang-Youn Kim, Kyu-Young Kim
  – 2007
• Dust Storm
  – Tarandi, Nellåker, Bäckström
  – 2012
• Radial-G
  – Geoff Cullen
  – 2014
Interactive Racing Game with Graphic and Haptic Feedback

\[ V_r(L) = \sum_{n=1}^{\infty} h_n \left[ u(L-p_n) - u(L-q_n) \right] \]

Where,
- \( u \): a unit step function, and
- \( L \): the distance from starting point to the current position of a car

(a)

(b)
Dust Storm
Radial-G
Methods and Techniques

• General approach
• Oculus Rift and two NovInt Falcon (or Razer Hydra if not possible)
• NovInt SDK
• Connecting via FalconUnity
• Algorithms and Interaction
Oculus Rift, NovInt Falcon, Razer Hydra
NovInt SDK

- A Windows platform, C++ language
- Combine with Unity JavaScript (UnityScript)
FalconUnity

• A library that allows for easy manipulation of Unity3D objects using a NovInt Falcon.

• Video: http://www.screenr.com/baP7 for those who are interested
Algorithms and Interaction

• Using existing algorithms to create a huge immersive world/track, i.e. Octree rendering (real time rendering)

• Applying existing interaction methods in a new way, using two NovInt Falcons at the same time
Fire particle generator
Unity’s terrain engine
Thank you!

Questions?

Carl Ahrsjö {ahrsjo@kth.se}
Anton Warnhag {awarnhag@kth.se}
Johan Storvall {johansto@kth.se}
Teacher:
Mario Romero {marior@kth.se}
FEEDBACK TO POD RACER
Pod Racing

FALCON (FORCE \rightarrow BREAK)?

Hover vehicle behavior?

\[ \text{Balance} \]

\[ \text{Fan} \]

(float in air/water)

\[ \text{Invisible} \]

Force | Input/Output

Priority of interaction

- Occurs

What do you let go of first?

Opponents | Now timer/checkpoint later

Jonas Ford...
Donatello

- Søren
- Philip
- Daniel
- Axel
You Are a Tree
General Goal
Make people smile!

Challenge
- A seamless experience
- Low learning threshold
- No penalties
Tech Goal

Procedural generation of trees, controlled with Kinect.

Challenge

- Real-time
- Reliable gesture recognition
- YOU Are a Tree
Personal Goal
Provide a testbed for learning more advanced computer graphics

Challenge
- Robust, but simple(!), interaction
- Flexible, but not too manual/complex
Tech

- Unity Pro
  - Boilerplate + Editor
  - Shaders
  - Animations
  - Sound
- Kinect SDK
  - v.1 or v.2
Tech cont.

- Tree generation
  - L-system
  - Mesh generation
  - Rigging
  - Skinning
- Environment
  - Ground and sky
  - Camera
  - Time, day night cycle
  - Particles: dust, spores etc.
  - Wind
  - God rays
Related

TreeSketch
http://vimeo.com/68195050
L-Systems

- Fractals, all the way down!
First Iteration

- Simple generation from primitives
- Basic Kinect gestures
  - Spread, duck, wave?
- Single tree, single user
Feedback to AY3
- PERSISTENCE
- SAVING
- EXPORTING
- PRINTING
- MULTIPLAYER
  - COLLOQUED COLLABORATION
  - DISTRIBUTED COLLABORATION (NETWORKING)
- SYNCHRONOUS
- A-SYNCHRONOUS
- SESSION
- CAMERA

L-SYSTEM (?)
  - LANGUAGE
  - FRACTALS
  - PROD. RULES
  - TERMINALS
  - PRODUCTIONS

*SPORES*  
- ARM/MOVEMENT
- WIND

(TXT.RAIN)  
UTTERBACK 2001?

*SCENARIO*  
- SUBWAY
- SECURITY

NOT IN
- ALIEN EXPERIENCE

*WHAT IS TURTLE GRAPHIC*

- NO DIRECT REPRESENTATION

- NOT "BEING" A TREE

- GROWING
  - CLIPPING
  - PRUNING

- INTERACTION (ADVANCED) (COMPLEX?)
- FINGERS (PRECISION?)

- NOT ESSENTIAL

- RELIABLE INTERACTION
- ABSTRACT / ART
Megatron

- Christoffer
- Mattias
- Ludwig
- Linnea
Project Proposal

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Christoffer
cwiss@kth.se

ludwigpe@kth.se

matlon@kth.se
Project Idea

Helper, 2D view

Main Player, 3D view

Enemy, 2D view

Level 1: Into the Dark
Motivation

- Create a social and fun experience for three persons
- Learn about
Goals and Challenges

- Fun multiplayer experience
- The experience must be exciting for all parts
- Increased immersion with Oculus and Razer Hydra
- Technical constraints, access to tech, difficulty to learn
- Higher level of detail (graphics and sound)
- Priority, lack of expertise, risk of breaking the core
Related Work

- **Uncle Roy All Around You: Implicating the City in a Location-Based Performance**
  - Benford, Steve. et al. (2003)

- **Designing Asymmetrical Collaborative Gameplay for Heterogeneous Device Ecosystems**
  - Speck, Robert Sean. (2013)

- **Experimental Evidence for Suspense as Determinant of Video Game Enjoyment**
  - Klimmt, Christoph et al. (2009)
Enemy LAPRAS
used CONFUSE RAY!
Methods and Techniques
Methods and Techniques
Thank You for Listening!

¿Preguntas?
Assignment 2
A google scholar method

1. Search for the root
2. Search within "cited by"
3. Search for the leaf
FEEDBACK TO SURVIVAL IN THE DARK
MEGATRON

- OPPONENT (ENEMY) - FUN SCARED?
  - TRAPS
  - AIR PLAYER
  - PRESSURE
  - CATCH

* CONSTRAINTS ON HELPER
* MAIN PLAYER (HEAD PHONES)
* COLLOCATED / DISTRIBUTED
* PROCEDURAL GENERATION
  - ENEMY PAIN'S MAP
  - DESIGNS SCARE HOUSE
  - TRAPS

HELPER'S UTILITY

- HELPER (SCARED?)
  - 2D GAME
  - THRILLED

- TINGLE TUNNEL (HELPER)
  - ZELDA...
  - PLACES ELEMENTS
  - CONTENT OF MESSAGE?
    - LEFT... →
    - TRAP AHEAD?
- ENEMY (SEES MESSAGES?)
  - LOCATES PLAYER
  - FUN TO SCARE
  - CONNECTIVITY
    - WIFI
  - HELPER - IPHONE / IMPS?

spy vs spy?
Thank you!

marior@kth.se

Questions?